March 1977

Smithsonian

Alika and Scott Lindbergh with a woolly friend in salon of primate center (p. 58)

Datsun introduces the family cars with a 240-Z engine.

Fuel injected response.
Finally, an economical family car that doesn't skimp on performance. Because the six-cylinder, overhead cam engine gives you all the get-up-and-go you've been missing. Plus the power you need to go up hills and get onto highways.

Suddenly, there's a family car that performs and handles like a 240-Z.

Sedan or station wagon.
Both give you the economy and durability you expect from a Datsun. The famous 240-Z engine has been proven time after time against the toughest competition. The all-steel unibody is welded for quiet strength. And the fully independent suspension in the sedan assures you extra smoothness and stability.

Suddenly, a new car with a built-in reputation for durability and long life.

Comfort of a mid-size car.
Comfort you can feel: In the lush interior, tilt steering wheel, six-way adjustable driver's seat, plush cut-pile carpeting that goes all the way through the trunk. And the soothing sound of the AM/FM stereo radio.

Comfort for your peace of mind: Thanks to steel belted radials, fully appointed dash. And automatic maintenance warning system.

And comforts you can opt for: Like automatic transmission, power steering and air conditioning.

All at a comfortable price. Compared to the six-cylinder Volvo or BMW, for example, you could save at least $2,000.

The new Datsun 810. Suddenly comfort and performance come together in an economical family car.

Suddenly it's going to dawn on you.

DATSUN SAVES

Pioneer has conquered the one big problem of high-priced turntables.

The high price.

The best way to judge the new Pioneer PL-510 turntable is to pretend it costs about $100 more. Then see for yourself if it's worth that kind of money.

First, note the precision-machined look and feel of the PL-510.

The massive, die-cast, aluminum alloy platter gives an immediate impression of quality. The strobe marks on the rim tell you that you don't have to worry about perfect accuracy of speed at either 33⅓ or 45 RPM.

The S-shaped tone arm is made like a scientific instrument and seems to have practically no mass when you lift it off the arm rest. The controls are a sensuous delight to touch and are functionally grouped for one-handed operation.

But the most expensive feature of the PL-510 is hidden under the platter. Direct drive. With a brushless DC servo-controlled motor. The same as in the costliest turntables.

That's why the rumble level is down to -60 dB by the super-stringent JIS standard. And that's why the wow and flutter remain below 0.03%. You can't get performance like that with idler drive or even belt drive. The PL-510 is truly the inaudible component a turntable should be.

Vibrations are damped out by the PL-510's double-floating suspension. The base floats on rubber insulators inside the four feet. And the turntable chassis floats on springs suspended from the top panel of the base. Stylus hopping and tone arm skittering become virtually impossible.

But if all this won't persuade you to buy a high-priced turntable, even without the high price, Pioneer has three other new models for even less.

The PL-117D for under $175*. The PL-115D for under $125*. And the amazing PL-112D for under $100*.

None of these has a rumble level above -50 dB (JIS). None of them has more wow and flutter than 0.07%.

So it seems that Pioneer has also conquered the one big problem of low-priced turntables.

The low performance.

U.S. Pioneer Electronics Corp., 75 Oxford Drive, Moonachie, New Jersey 07074.

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*For informational purposes only. The actual resale prices will be set by the individual Pioneer dealer at his option.

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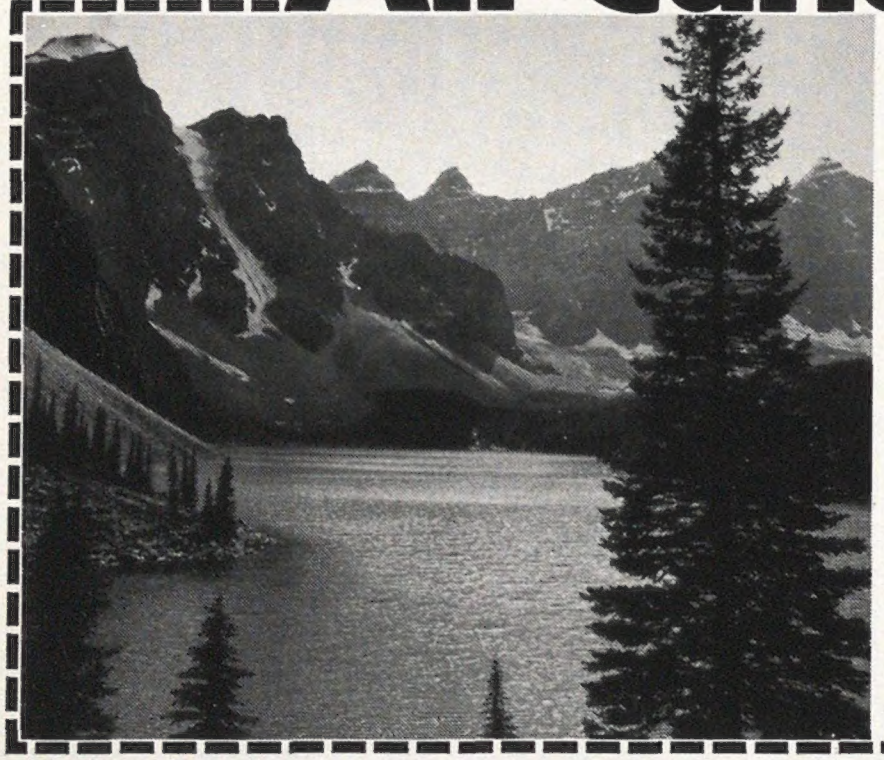

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"Last week I sowed my wild oats. The real fun starts in two weeks, when I try to kill them all."

"Wild oats always make people think of second-rate Victorian novels," says Gulf agricultural chemist Jim Ahle.

"Actually they're big trouble in North and South Dakota. They crowd out the wheat, and cost the farmers there over two hundred million dollars a year.

Single-minded

"A lot of things will kill wild oats. What we wanted was a single-minded herbicide that won't harm any other plants, or the people or animals who eat the grain.

"To solve that problem, we developed a product called Carbyne®. It proved to be one of the most successful wild oat controls ever developed.

"That was several years ago, but we're still running experiments with Carbyne, either new formulations or in combination with other herbicides, so you can control a variety of weeds with one application.

"For each new formulation, we sow thousands of wheat plants and wild oats in seed beds, and in a few weeks spray them with the experimental herbicide. Then we check to make sure the weeds are dead and the grain uncontaminated.

One in 7,000

"For every herbicide that comes onto the market, at least seven thousand have been tested and rejected for one reason or another. Carbyne is a winner, but it's just one of many herbicides and pesticides we're working on here at Gulf.

"The American farmer is the most productive on earth. The challenge, as I see it, is to keep him that way."

"A good wild oat is a dead wild oat."

Gulf

Gulf people: meeting the challenge.

Gulf Oil Corporation

Secretary Ripley's comments

The view from the castle

Part of the National Zoo functions outside Washington, not to exhibit animals but to preserve them from possible extinction

A recent visit to Front Royal, Virginia, with members of the National Board of the Smithsonian Associates, prompts me to report on the present status of the 3,265 acres of our National Zoological Park. Our Zoo, as I have described earlier (SMITHSONIAN, May 1974), now consists of two parts: the 165-acre Zoo in Rock Creek Park in Washington, visited by millions each year, and the 3,100-acre support facility at Front Royal, acquired in 1974.

There had been an Army Remount Station at Front Royal until the demise of the horse cavalry in the pre-World War II period. Then a Department of Agriculture cattle experiment station was located there. When it was transferred to the Smithsonian as surplus property by the General Services Administration, we discovered that the hilltop fields adjacent to the Skyline Drive provide hay, including alfalfa, which is rich in trace elements of minerals such as selenium, largely lacking in hay from the flatlands of the Piedmont. Such hay has had to be imported from the West for the Zoo's rare grazing animals. Eventually, we will produce 300 tons of this hay annually, more than enough for our needs.

What has already been developed in three years is remarkable. With cooperation from other major zoos in New York, Chicago, Baltimore, Minnesota, California and Texas, we have managed to start active breeding programs with a number of rare and endangered species of animals, whose future probably lies in such controlled programs. Père David's deer, extinct in the wild state in China since the end of the 18th century, is certainly one such.

In other paddocks we have Burmese brow-antlered deer, or Eld's deer, very rare in Southeast Asia now; muntjacs, or barking deer; golden marmosets, tree kangaroos, binturong (a Southeast Asian civet), scimitar-horned oryx, Bactrian camels, zebras and the wild ass or onager. Birds of certain species, such as rheas, emus and cranes, can be combined with these herbivorous mammals, and already we have been able to breed a number of South American rheas, Bali mynas and Malaysian argus pheasants. We are also carrying on a behavioral study of the maned wolf, crab-eating fox and South American bush dog.

Zoos today, threatened with increasing difficulty in obtaining stock (see SMITHSONIAN, February 1975), lend breeding animals back and forth. Our Indian rhino, first of its species bred in the Western world, is on breeding loan to New York. One of our black rhinos has just sired a young one at San Diego. So we can preserve species that are not only rare in nature, but perhaps almost impossible to import due to legislation or political turmoil in some parts of the world. And, in some cases, it is simply that our own techniques are better; witness our experience with the lesser or red panda from the Himalayas, bred more successfully here than anywhere else in captivity.

Important behavior studies can be made in such a zoo, studies which may be crucial to the species' survival. With the incredible decline in natural habitats all over the known world, programs such as those at Front Royal can point the way to a new and vital kind of conservation.

S. Dillon Ripley

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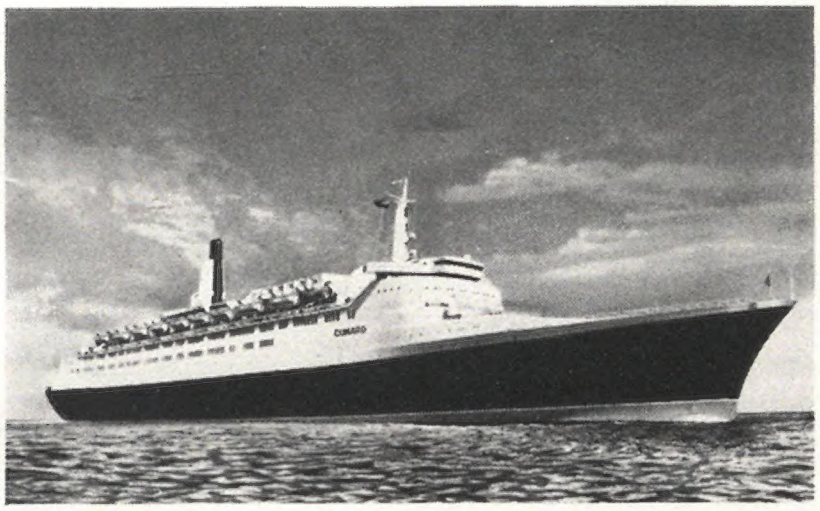

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Or perhaps we should say, an uncommon dedication.

DRIVE ONE OF OUR LEGENDS

PORSCHE
+AUDI

Robert S. Oakes, *National Geographic*. © Supreme Court Historical Society.

The Justices' wives are: seated, from left, Marion Stearns White, Marjorie Leonard Brennan, Elvera Stromberg Burger, Mary Ann Bertles Stewart, Cecilia Suyat Marshall; standing, from left, Natalie Cornell Rehnquist, Dorothy Clark Blackmun, Josephine Rucker Powell and Elizabeth Sheeren Stevens. Portraits are of Chief Justices John Jay (left) and Oliver Ellsworth.

Letters to the Editor

Supreme Court

Dear Sir: For two reasons I was pleased with the January wraparound cover portrait of the members of the Supreme Court of the United States. One, because of the delightful informality; the other, because one man, nevertheless, was keeping his eye on things. Perhaps that is why he is the Chief Justice.
J. Boyd Mullan
Rochester, New York

Dear Sir: Turnabout is only fair. Please show us the "Court of Last Resort"—the Justices' wives [see left].
Elaine Thomas
Chicago

Dear Sir: The article and photographs in your cover story on the Supreme Court were outstanding. They have made a major contribution to public understanding of this important branch of government. There is, however, one statement in Richard Williams' article which I would like to amplify on the basis of my personal experience.

The statement characterizes Michael Rodak, the distinguished Clerk of the Court, as "high-strung." In my three years of service as Associate Justice of the Supreme Court, I had daily and close association with Mr. Rodak and never found him to be high-strung. On the contrary, I found him, to borrow another word from Mr. Williams, "unflappable."
Arthur J. Goldberg
Former Associate Justice of the Supreme Court of the United States
Washington, D.C.

His destiny was to die in poverty and disappointment.

Yet his genius gave the world some of the most beautiful music ever heard.

At the age of 6, Wolfgang Amadeus Mozart was the talk of Europe.

By the time he was 8, he had sat on the knee of Empress Maria Theresa, delighted the court of George III and composed four sonatas for clavier and violin. But people who fussed over a child were less interested in a struggling 22-year-old musician. When illness took his life at 35, he was nearly destitute... and was buried in a pauper's grave.

Yet he left the fickle world an astonishing body of music, ranging, like his fortunes, from lighthearted frolics to epic tragedy... as you will discover in TIME-LIFE RECORDS' magnificent boxed set on Mozart—the first in a book and record series called GREAT MEN OF MUSIC.

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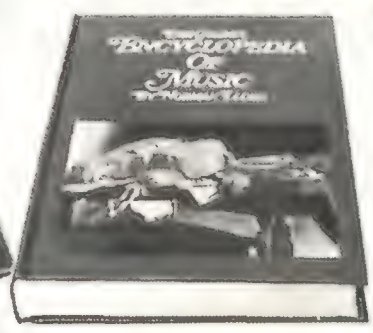

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UNITED AIRLINES

Dear Sir: I do not believe that the late Mr. Justice Hugo L. Black was the first to occupy chambers in the Supreme Court building. He was, indeed, first in many things, but I am fairly certain that Mr. Justice Owen J. Roberts (Black's next-door neighbor) and Mr. Justice Pierce Butler were utilizing their respective chambers when Justice Black was seated.
Jerome A. Cooper
Birmingham, Alabama
Mr. Cooper is correct. Justices Roberts and Butler, along with George Sutherland, moved in as soon as the building was completed in 1935. Justice Black moved in after he had won confirmation in 1937. Ed.

Tibet

Dear Sir: Jerrold L. Schecter's article, "Official atheism has killed religion in remote Tibet," brings a faraway place like Lhasa closer to home. My real regret is that countries are going the way of corporations. As thousands of little businesses have been swallowed by the conglomerates, so have the small, fiercely independent nations been allowed to be engulfed by their "civilized" neighbors. The loss of these and their ancient cultures is a loss for our entire planet.
Catherine Folio
Middletown, New Jersey

Army Corps of Engineers

Dear Sir: In regard to Don Moser's December article, first of two parts on the Army Corps of Engineers, a number of rigorous economic studies have indicated that, in fact, the Corps has greatly overestimated the economic benefits of its projects. According to one study by Dr. Bruce Hannon and Dr. Roger Bezdek of the University of Illinois, a greater number of jobs would be generated if funds currently allocated to Corps projects were shifted to any of five alternative programs, such as: tax relief, national health insurance, social security benefits, mass-transit construction or waste-treatment construction.
Mina Hamilton Haefele
President, Delaware Valley Conservation Association
Stillwater, New Jersey

Dear Sir: I detect in "Mangrove island is reprieved . . ." a smug satisfaction that the big, bad owner has been foiled in the exercise of freedom in use of his property.

And what of the cost-benefit ratio? As the owner of a couple of acres of coastal wetland, I can testify as to whose cost—the property owner's, in the form of interest on money invested and taxes assessed, both on the basis of waterfront property values, which are higher than normal land values. The overall value to Man of one freshwater marsh was calculated to be $3,100 per acre annually. Direct benefit of my acres to me? Not noticeable.

I suppose the satisfaction I derive from knowing that I am Man's benefactor to the tune of $5,000 or so a year should outweigh the resentment that arises from the constraints enforced by the various official regulatory watchdog bodies that tell me I cannot, of my own volition, develop, fill, build a pier across, cut growth on (no matter how unsightly), or even walk across my property, lest I damage the ecology thereof.

And what about such areas being "more productive than Iowa corn land?" In contrast to the wetland owner, the Iowa farmer is free to plow and plant as he will. In contrast to the wetland owner, the Iowa farmer pockets or banks the return from his holdings. And if his return is not great enough, he has been subsidized; he has been paid to adopt improved practices that are in his self-interest to use; he has even been paid to raise nothing.

Perhaps the government should reimburse the wetland owners for their recognized contribution—at the same time removing the incentive for owners to alter or develop wetlands.
W. J. Hadden
Grafton, Virginia

Dear Sir: When will Congress realize that the Corps of Engineers cares nothing for the welfare of the country, only trying to justify appropriations by thinking up useless projects? Take the dam(n)ing of rivers. We are going to need all the good arable land we can save in coming years, and don't they know the alluvial plains are some of the best? Yet the dams flood this good farmland and when the Corps channelizes the streams the water runs straight off without doing the land any good.
Mrs. Philip L. Cook
Ormond Beach, Florida

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Dear Sir: In his article on the Tombigbee project, Don Moser, I notice, breakfasts on granola and paddles an aluminum canoe, both items of rather advanced technology. Why don't the environmentalists go the whole hog? Why not back to the Indians, making fire by rubbing sticks together, paddling a bark canoe and foraging for food, not to mention that without a written language such an article as Moser's could not appear in SMITHSONIAN.

Every technique that mankind has invented and developed has been in reaction with his environment, at the expense of nature—from the shaping of the first arrowhead to the most sophisticated technology of today. Environmentalists seem to ignore this truth; they want to go back only so far as to enjoy the best of both possible worlds.
Philip Sharnoff
Washington, D.C.

Dear Sir: I have read both of the Moser articles and believe they are part of a campaign to discredit the Corps of Engineers. I suggest the following additional literature for your readers: *Road, Rails, & Waterways* by Forest G. Hill, University of Oklahoma Press; *The Falls City Engineers* by Corps of Engineers, Louisville District Engineers; *A Century on the Mississippi* by Floyd M. Clay, Memphis Engineer District; *A History of the Rock Island District, Corps of Engineers 1866-1975* by Roalt Tweet, Rock Island Engineer District.
James V. Swift
Business Manager
Waterways Journal
St. Louis, Missouri

Dear Sir: Yes, "the Corps cares," but apparently not enough, even when its own credibility is endangered. Citizens should urge Congress and President Carter to end the latest stage of the Tenn-Tom project and establish an effective review of those 600 other projects.
John M. Schuh
Gulfport, Florida

Charles Lang Freer

Dear Sir: I would like to correct a small error in Susan Hobbs' article on Charles Lang Freer's American collection. Whistler's father worked as an engineer, not, as stated, on the building of the Trans-Siberian Railway, which was not started until 1891. He worked on the railway from St. Petersburg to Moscow.
David Margolies
Berkeley, California

Around the Mall and beyond

Dear Sir: In speaking of your mathematical genius friend Mel Zisfein at the National Air and Space Museum, how could you—you my ideal of a fine publication—make the mistake of printing "whomever was riding in the taxi" instead of "whoever."
Mrs. Wilbur R. Kelley
Albany, New York
To Mrs. Kelley and the many other readers who have pointed out that it should have been "whoever" instead of "whomever," Edwards Park gives his chastened thanks. He promises never to use that construction again. Ed.

Dear Sir: The calculator games Edwards Park mentions illustrate a sometimes overlooked property of a calculator—that of rounding off errors. Evidently the calculator used by Mr. Zisfein has an eight-digit display. If one calculates the problems you set, by hand, or on a calculator having a ten or more digit display, one finds: $9876543 \div 8 = 1234567.875$.

When I first bought a calculator, my granddaughter, then ten years old and much more sophisticated than I about this, gave me a complicated puzzle involving oil companies. The end result of the calculations was the number 71077345. Enter this on your calculator, turn it upside down, and see what it spells.
Bernard M. Jaffe
New York City
A cute trick—it spells Shell Oil. Ed.

Dear Sir: I am truly amazed that a "Dominique" chicken proved so obstreperous at the 1973 inaugural ball. When my grandma was raising chickens I recall that she always chose the "Dominecker" hens, as she called them, to "set" on eggs because they were by far the calmest. I suggest that perhaps either the chicken in question was a Democratic Party spy or, more prosaically, she had decided to nest in the $1,000 box.
Verna F. Willson
Burbank, California
The Dominique should not be maligned. It seems that chicken was a Rhode Island red. Ed.

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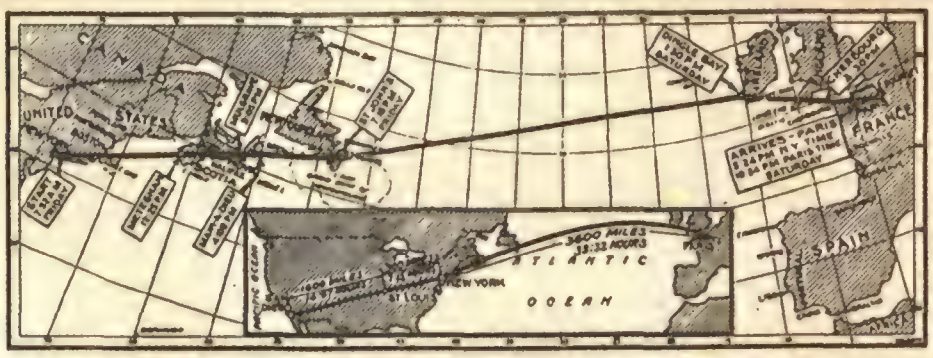

MAP OF LINDBERGH'S TRANSATLANTIC ROUTE, SHOWING THE SPEED OF HIS TRIP.

CROWD ROARS THUNDEROUS WELCOME

Breaks Through Lines of Soldiers and Police and Surging to Plane Lifts Weary Flier from His Cockpit

AVIATORS RESCUE HIM FROM FRENZIED MOB OF 25,000

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By EDWIN L.

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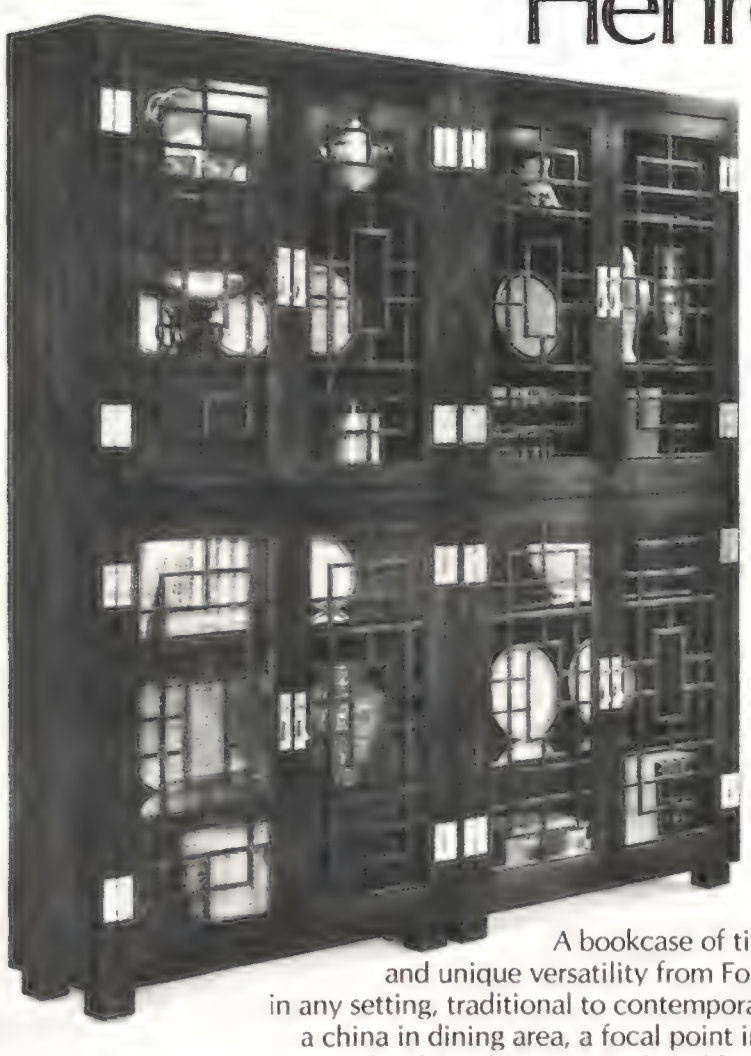

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Around the Mall and beyond

The fourth of this month was our traditional Inauguration Day until the "Lame Duck Amendment" was ratified in 1933. The old date was considered helpful to those of our forefathers who had to travel long distances to Washington over the wretched roads of winter. The change came about when the roads became considerably less wretched than the burden of legislative and administrative lame ducks—those who had been voted out of office in November but were still there. As roads and other communications improved, more and more Americans began to apprehend remarkable political deteriorations after Election Day.

Although Mr. Carter's Inauguration Day has received—Lord knows—quite enough coverage, one feature of the Inaugural Parade is hereby noted because it has a Smithsonian connection. That is the inclusion in the line of march of four cars that run on something other than gasoline. They passed the reviewing stand (in which the solar heat didn't work) after a replica of General Grant's carriage (not the real one, which is at the Smithsonian) and before the Kentucky float with Colonel Sanders aboard it.

Concerned about energy shortages, Secretary Ripley suggested some time ago that the parade should display a hydrogen-powered car. To many scientists hydrogen seems the most effective of all the gasoline substitutes. Work is being done on hydrogen engines by the Billings Energy Corporation of Provo, Utah.

The Smithsonian started chasing around after a hydrogen car, but found the difficulties and costs of getting one from Utah a pretty high hurdle. We appealed to the U.S. Energy Research

and Development Administration for help. ERDA, as it is called, picked up the ball, arranging and paying the bill for not only a hydrogen car but for three other alternatively powered automobiles as well to join the fun on January 20.

The hydrogen car is a 1977 Cadillac Seville which stores the gas in four tanks. It looks like any old 1977 Cadillac Seville, but the only waste product to come out of its exhaust pipe is water vapor.

Along with it is a 1973 Plymouth powered by a gas turbine. It runs on practically anything from diesel oil to Chanel No. 5, burning its fuel so efficiently that its exhaust is just about free of pollution.

There are also two electric cars, one a Subaru utility van, the other a little white Renault. Both can make better than 50 miles an hour on their batteries. The van is good for 50 miles before recharging, while the sedan does 25 miles.

It is not often that the Smithsonian has such a direct influence, and to savor the moment I hurried down to ERDA headquarters to look the cars over. I was introduced to Mr. Robert Griffin, who told me that two of them were parked at the building, open for inspection. I would have to wait until Inauguration Day to see the hydrogen Cadillac and the electric van, but I could make the acquaintance of the turbine Plymouth and the electric-powered Renault right now if I wanted.

Of course I wanted. Down we went and out on the broad sidewalk in front of the ERDA building where a nice white Plymouth with chrome vents along the sides was parked. Mr. George Thur, Chief

George Thur, ERDA engineer, inspects gas turbine engine in 1973 Plymouth.

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Engineer of the Heat Systems Branch of ERDA, got into the driver's seat and turned the ignition key. A red light went on, then after a little rising whine from under the hood, went off. "OK," he said. "We're going."

There was little more than a gentle hum from the engine even after he raised the hood. He found a nickel and balanced it on edge upon the engine block—or at least upon some level flange in the most jam-packed engine compartment you've ever seen. The coin remained upright despite acceleration of the engine and even stayed on edge when Thur turned the key off and the whine died.

This activity produced an unexpected onlooker. ERDA is not situated in one of your choicer Washington sections, and one of the neighbors, a seedy gentleman clutching a brown paper bag, came carefully tacking toward us across the pavement. "Hold it right there," he commanded. "Wait just a cotton-pickin' minute!" And with that he reached the safe mooring of the car and celebrated his voyage with a deep draft from the bottle in the bag. I suggested that we try using whatever he was drinking for fuel. Thur agreed that it would probably work fine, but that the engine was adjusted for a mixture of diesel oils. Anyway, at the mere idea of such a thing our new friend up-anchored and sailed warily away on a broad reach, paper bag carefully stowed out of sight.

Thur closed the hood and invited me into the driver's seat. Key in ignition . . . turn . . . red light . . . whine . . . light goes out . . . shift automatic drive to "D" . . . touch accelerator . . . small hesitation, then off we go.

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Annually, delegates from America's nearly 1,000 rural electric cooperatives and public power districts which serve some 25 million people across the nation, meet to formulate and adopt policies on national issues.

The simple fact is that conservation makes it possible to stretch out the world's dwindling energy resources while we develop new technologies

More doctors, water and sewer systems, and improved housing are today's community development targets for rural electrics, longtime leaders in spearheading better social and economic programs for local citizens. Robert Mace, manager of San Luis Valley Rural Electric Cooperative, Monte Vista, Colo., is president of one of the state's five Health Maintenance Organizations.

Flint Electric Membership Corporation, Reynolds, Ga., has grown from just over 2,800 members in 1944 to more than 30,000 in 1976. Meter readers use an electric car (dressed up for the bicentennial) to get to some of the homes, farms and businesses in the 15 counties where the cooperative serves.

So far in this country we've taken only small steps toward a real program of energy conservation.

Efficient use and management of all forms of energy are now imperative. Public awareness of this need must be greatly increased. People's consumption patterns will have to be altered; industry must make changes, and government policies to encourage and require wiser use must be implemented.

Conservation does not mean austerity nor a lower standard of living. On the other hand, without it as part of a comprehensive energy policy, energy shortages could in the long run severely restrict the opportunities and advantages we now enjoy, and limit our ability to pursue our traditional hopes and dreams for a better life.

America's rural electric systems

The National Rural Electric Cooperative Association is the service organization for the nation's electric cooperatives. Write "Viewpoints," NRECA, 2000 Florida Ave., N.W., Washington, D.C. 20009 for further information on rural electric energy positions.

It's a superb car. I was very cautious at first, but when we reached a freeway where traffic was fast, Thur said, "Go on, step on it," and I did so, bravely. Again there was that small hesitation, then a deep-throated rumble from the innards of the beast, and a forward leap that snapped my head back. In steady driving, the car moves however fast you want it to with barely any sound and certainly no trace of vibration. I couldn't check on the effluent from the exhaust, but I take ERDA's word that it is negligible.

I brought the turbine car back to headquarters and was then turned over to Charles Pax, an engineer of the Hybrid and Electrical Systems Branch. He led me into the underground parking garage where a white Renault was backed toward a wall and connected to a wall outlet by a yellow utility wire. This umbilical was recharging a bank of batteries that filled the floor of the trunk. In front, under the hood, many more batteries were arrayed. I've never seen so many of them all stacked together.

Charlie Pax unplugged the recharging line and persuaded me to get in the driver's seat. Again, a turn of the key got the thing started, but it was much less certain an operation than with the turbine. It took a moment to realize that the electric motor was running, for at idling speed it was practically noiseless.

Not at driving speed, however. Shifting to the drive position and pressing the accelerator produced a remarkable range of musical notes. The harder you press, the higher the note. As I started out of the parking garage, a little jerkily, I performed a near-perfect rendition of the opening bars of *Lara's Theme* from *Doctor Zhivago*.

We reached the street, going up the ramp at high C, then throttling back to the middle scale. On the street outside, I got the Renault up to 35 miles an hour (that's F sharp above middle C), then put on the brakes for a U-turn—it was perfectly legal on that street, officer, honest.

The brake took hold with a great groaning of dissonant chords. You feel the weight of all those batteries when you come to a stop. We eased musically back into the garage and hooked up the umbilical again. Charlie said it wouldn't need much recharging.

I regretted not driving the hydrogen Cadillac, but it will be displayed at the Institution (as of this writing) soon after the parade.

From unusual cars it is a natural step to unusual aircraft. The National Air and Space Museum, subject of highly deserved raves from this column and others, has opened its Silver Hill facility to the public. This collection of big warehouses just outside the District of Columbia in Maryland was the repository of a vast number of air- and spacecraft which had no true home until the new museum was completed last year. Now the great stars of the collection—the Wright plane, the Lindbergh plane, the Apollo 11 spacecraft and a host of other notables—are permanently settled down in that vast and beautiful building on Independence Avenue, and the once overcrowded facility can take care of some marvelous old machines, restoring them and preparing them for their turns in the museum.

To allow people to see some of the planes and engines that are ready and waiting in the wings, the Smithsonian has put them on exhibition, with descriptive panels and all, in two of the ware-

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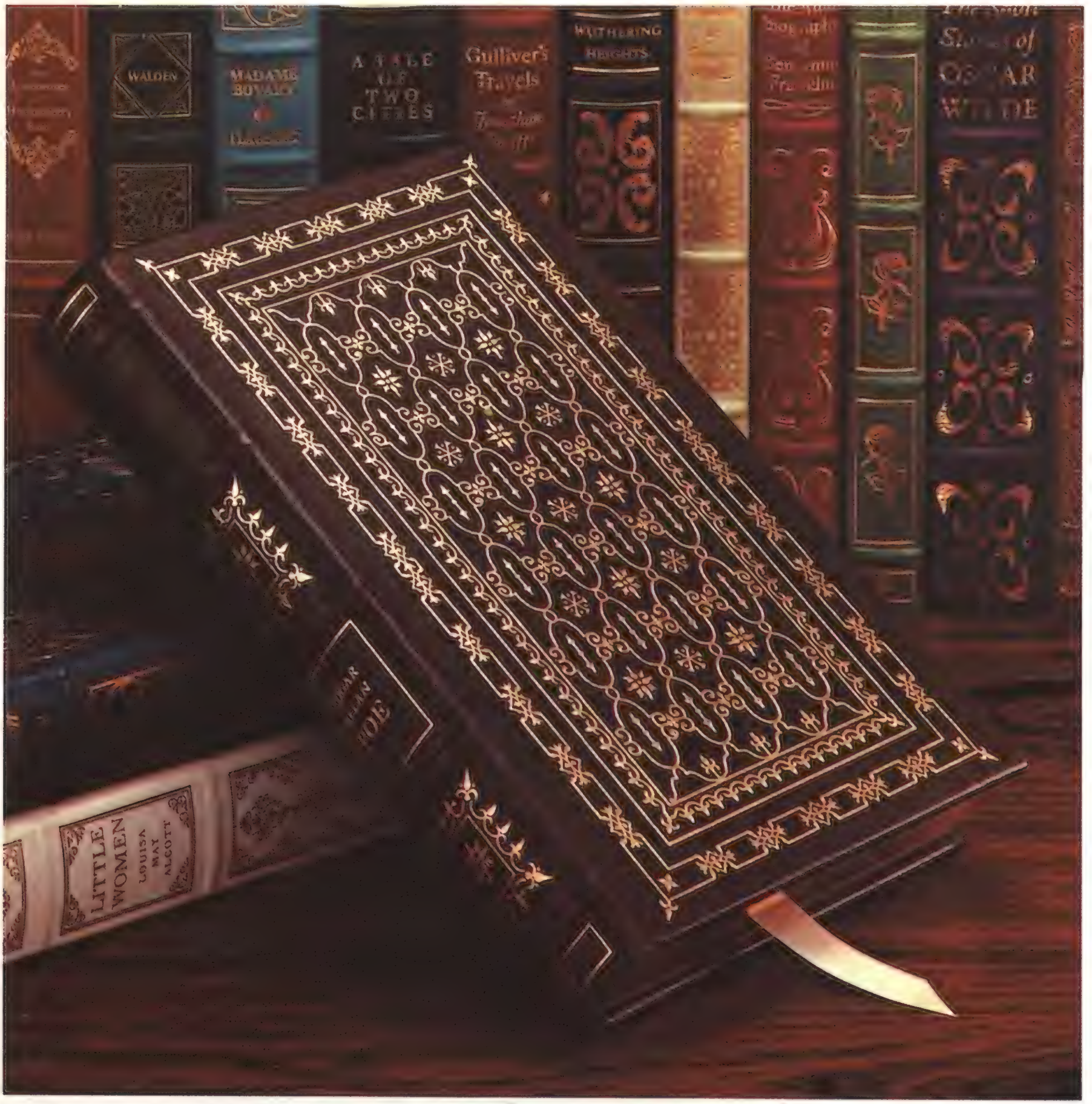

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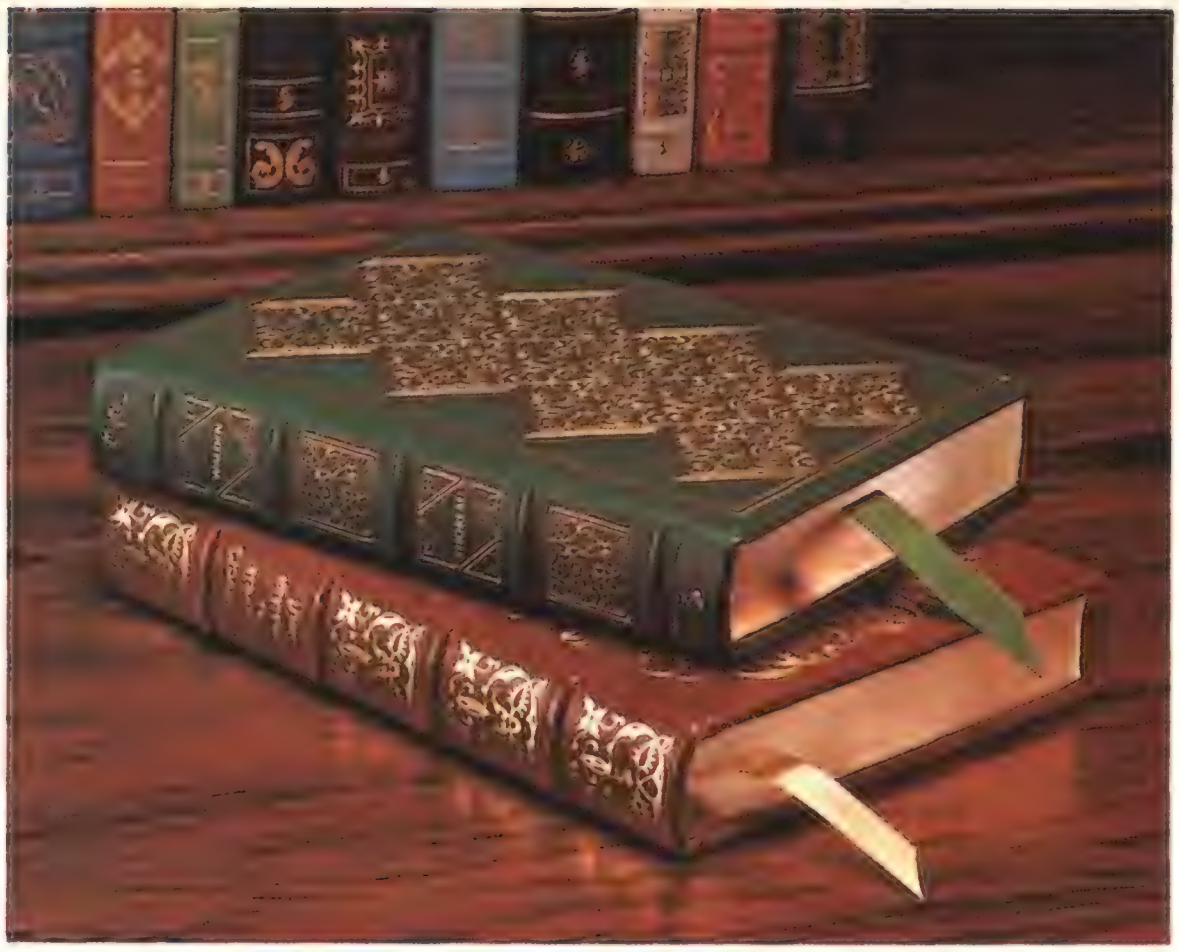

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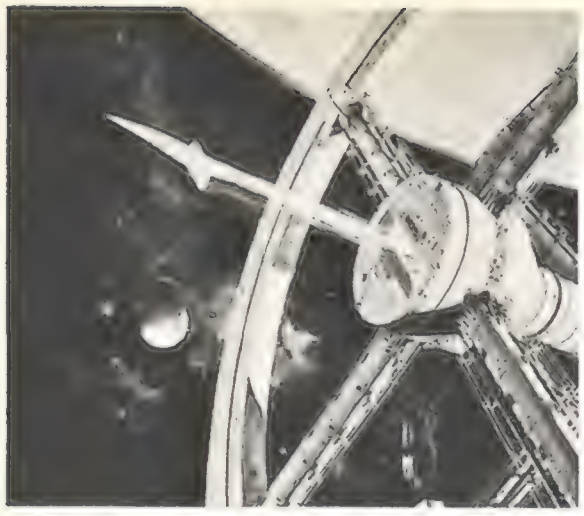

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Phenomena, comment and notes

Unexpected denizens of Loch Ness, a new megamonster of the deep and health hazards of solar energy

The debate over nuclear energy continues to flare with report and counter-report on safety or lack of it, reliability or lack of it, efficiency or lack of it, and its advantages and disadvantages vis-à-vis coal and other alternative sources. The nuclear industry is now actively on the attack, in fact, sounding the alarm bells about the health hazards of using coal. Even gentle, passive, universally beloved solar energy has come in for a lick.

The December issue of *Atom News* discusses a book by a Professor Peter Beckmann (*The Health Hazard of NOT Going Nuclear,* Golem Press, Boulder, Colorado) which announces that solar energy could be a killer. The professor suggests a possible solar-inspired outbreak of household accidents, specifically an increase in the number of people who fall off ladders when on the way to the roof to inspect their solar collectors.

A 1984 machine

On the energy conservation front, a New Jersey firm has invented a device that will automatically turn off the lights, the TV and other appliances when no one is in the room. By means of ultrasonic sound waves, the device detects the slightest movements by humans and other creatures, and stays switched on only as long as someone is in the room.

For households frequented by teen-age humans, this device is without question a necessity. Teen-agers are capable of creating chaos, but rarely electronic silence.

One sees other possibilities in this remarkable machine. Consider the family dog left to its own devices while everyone is out. Naturally, the noble guardian enters the living room and climbs up on the sofa. And the ultrasonic sound system activates a tape recorder and the master's voice says, "Balthazar, get off the sofa. Shame on you."

The possibilities are almost limitless. One might even record a message for those teen-agers—an endlessly patient, unavoidable nagging machine.

When Jupiter aligns with Mars . . .

With nuclear proponents adopting their environmental adversaries' tactic of crying catastrophe—however improbably—it is nice to know that one gloom-and-doom theory linking the tenets of astrology to those of science and predicting a terrible earthquake problem in 1982 seems to have been rendered inoperative, in the vernacular of bureaucracy. The theory was known as the Jupiter Effect; proposed by two scientists in a book of that title, it said that in 1982 several planets would all find themselves arranged in a straight line out from the sun, thus exciting an unusual gravitational force on our resident star. This would affect the sun's activity, which would, in turn, affect our own atmosphere's activity, creating a kind of drag on our rotation leading to problems in the Earth's crust and, most likely, a monstrous movement at the San Andreas fault.

Californians may take comfort from a report in *Nature* (Vol. 265, No. 5589). A critic of the Jupiter Effect theory points out that the "superconjunction" of Jupiter, Saturn, Uranus and Neptune has occurred every 179 years, more or less. The critic, W. H. Ip of the University of California at San Diego (who therefore has reason enough to inspect the theory), looked back through the record of earthquake activity in northern China. He found that high levels of earthquake activity just don't match the periods of superconjunction.

Unlocking Loch Ness

So far, the recent intense explorations of Loch Ness have produced only speculative monsters (see p. 132), *and* the idea

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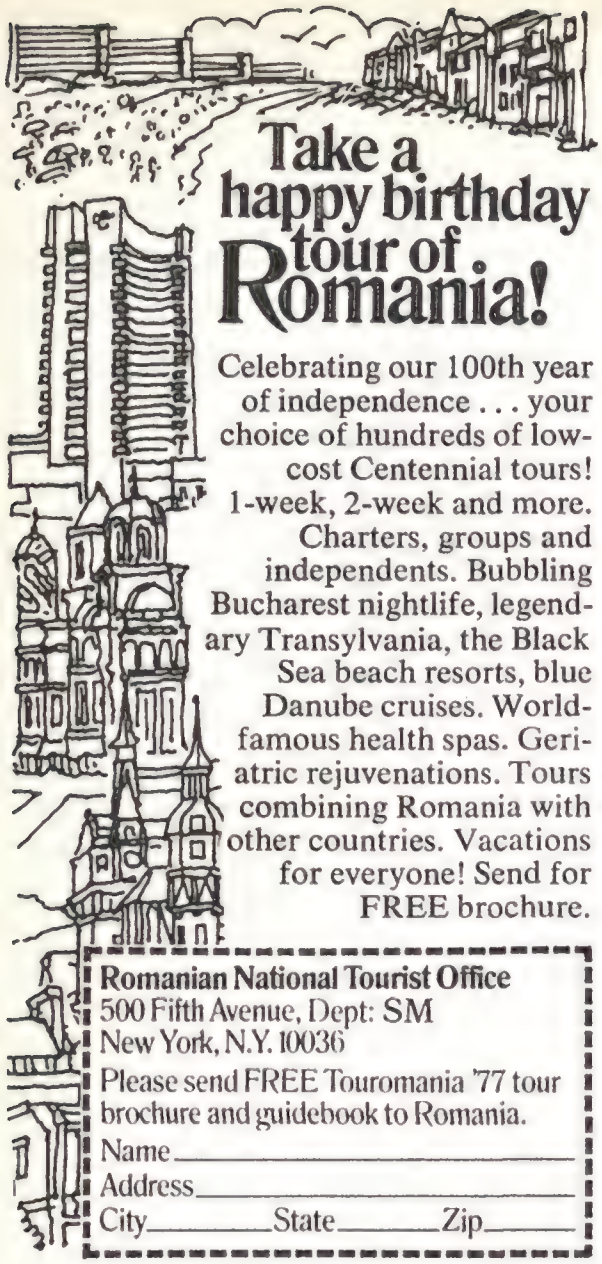

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that a monster search, fruitful or not, can be a good thing for the science of limnology—and even archaeology.

For example, elaborately equipped photographers from a geographic organization located in Washington have discovered some unexpected small fish in the loch's murky waters and a lot of logs on the bottom. More systematic efforts are profiling the bedrock bottom of this mysterious body of water, which seems to be U-shaped rather than V-shaped.

This is a finding made by Martin Klein of Klein Associates, which is associated with the Academy of Applied Science, which in turn is associated with the *New York Times*. Mr. Klein, writing in *Technology Review* (Vol. 79, No. 2), reports on his summer's work at the loch, during which he used sonar to probe the bottom on the theory that monsters too must die and thus monster bones would accumulate on the bottom. (Mr. Klein first ascertained that sonar *can* locate bones by dropping some imported Canadian mammoth bones in a U.S. lake and finding them.)

What he found in Loch Ness are the remains of a PBY Flying Boat from World War II, those of a wooden sailing barge, a whole series of caves in the loch's steep walls (hideouts for pliosaurs?), and a few objects projecting from the silt that might be logs or just might be monster remains.

Perhaps even more interesting, Klein and his associates found several circles—some concentric, some overlapping—made out of stone in the manner of various archaeological sites around the countryside of the British Isles. Some of these were found at depths of 25 meters, casting confusion on the matter of when the loch's water levels rose: the loch is presumed to have been buried under thousands of feet of glacial ice some 12,000 years ago.

All of this calls for the usual "further research" but, for the meantime, the circles of stone are known, not surprisingly, as Kleinhenge.

The big one that got away

On the subject of monsters, it is rare enough to find a new species of anything even the size of a lizard (Italian scientists did find a new lizard a few months ago). How rare, then, to find a new species of

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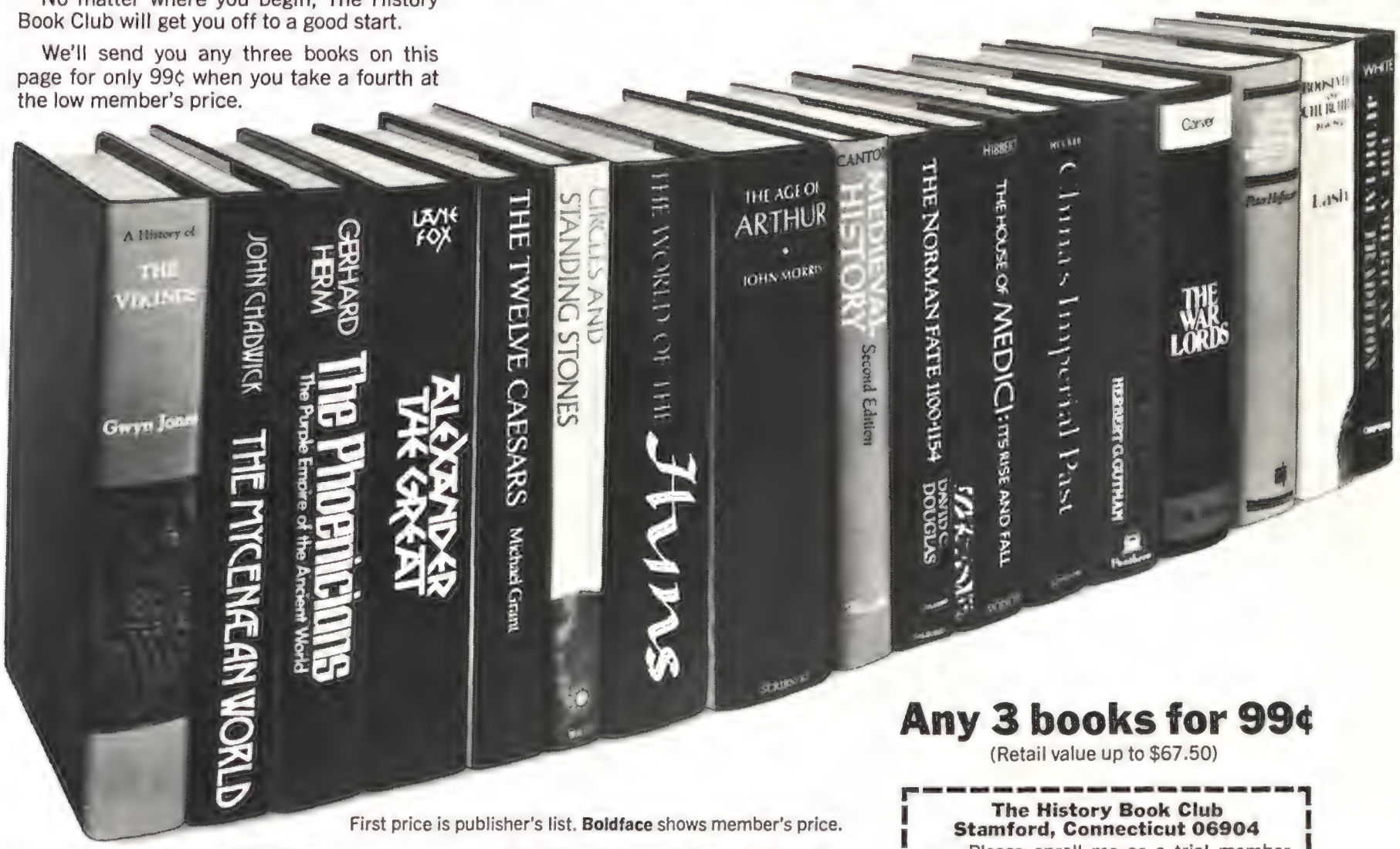

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an animal 14½ feet long weighing nearly a ton! Nevertheless, it happened.

Not long ago a Navy torpedo recovery vessel dropped a sea anchor into 500 feet of water off Hawaii. Instead of a torpedo they later hauled in a suffocated shark of the dimensions given above. It was characterized, according to *Science News* (Vol. 110, No. 25-26) by a bathtub-shaped lower jaw, an enormous, short-snouted head and 484 vestigial teeth. The teeth apparently got fouled in the vessel's parachutelike sea anchor.

The shark, unquestionably a new species, apparently ate shrimp and is, for the nonce, known to science as Megamouth, until ichthyologists find an appropriately classical taxonomic binomial. Megamouth, awaiting further analysis, resides in the California Academy of Sci-

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Last year was the first Women's International tournament. And already it has become one of the most talked-about challenges among the women professionals on the L.P.G.A. tour.

With a purse of more than $70,000, this year's Women's International, April 14th through 17th, will be even more exciting. Be there to see it. Or watch the NBC network coverage April 16th, 5:00 to 6:30 p.m., and April 17th, 3:00 to 5:00 p.m. (EST).

You'll have to go a long way to find more excitement. For more information, contact Moss Creek Plantation, P.O. Box 1697, Hilton Head Island, South Carolina 29928. Telephone: (803) 785-6181 or 785-1488.

THE WOMENS INTERNATIONAL
MOSS CREEK PLANTATION

ences in San Francisco because, *Science News* says, the usual destination for such oddities, the Smithsonian, is too far away and doesn't have a crane big enough to reel Megamouth into its halls. This last is, of course, nonsense: the Smithsonian has reeled such creatures as DC 3s into its halls.

A plethora of new sharks

If one new shark species, added to the presently known 350, makes the zoological heart palpitate, imagine the addition of 64 shark species all found in one place. That is precisely what has occurred, the specimens having been found in Montana in an uneponymously named place called Bear Gulch. The sharks, of course, are fossils from Carboniferous times 300 million years ago when a shallow sea covered western North America.

One four-foot shark had a dorsal fin that was hinged like a rudder, making it the probable all-time champion in maneuverability. Another had a hornlike protuberance, somewhat like a unicorn's; yet another had crablike pincers protruding from its snout. So well preserved are these many specimens that their discoverer, Dr. Richard Lund of Adelphi University, even found fossil shrimp in a few fossil shark stomachs.

To discover this mostly unknown shark fauna is something akin to finding a few million years' worth of previously unknown dinosaurs all at once: it will take years to sort it all out.

What is fairly clear is that long ago the versatile sharks evolved into such diverse forms that they filled all the available ecological niches that bony fish now inhabit. A question arises, asked by *New Scientist* (Vol. 73, No. 1033): Why, if they were so well adapted, did so many of these shark species die out, to be replaced by bony fish? Not, says Dr. Lund, because the bony fish were better adapted, but probably because of some major climatic change that wiped out many species of sea and land animals all at once, leaving behind just a few selected shark and bony fish species to repopulate the seas.

Moral: even paleontology textbooks should be loose-leaf affairs. Also, we should consider raising the budget for climatological research.

—James K. Page Jr.

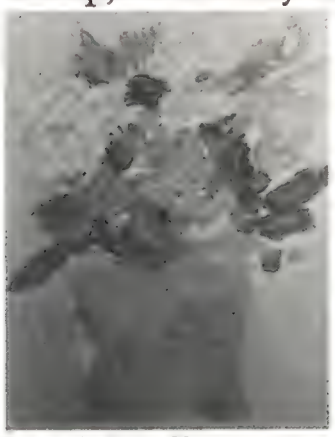
How to tell original prints from cheap reproductions.

Buying original prints is an excellent way for the novice to make a modest investment in beautiful works of art.

The buyer had better beware, however.

As more and more attention is being given to art as an investment, more and more dealers are trying to pass off cheap reproductions as fine art.

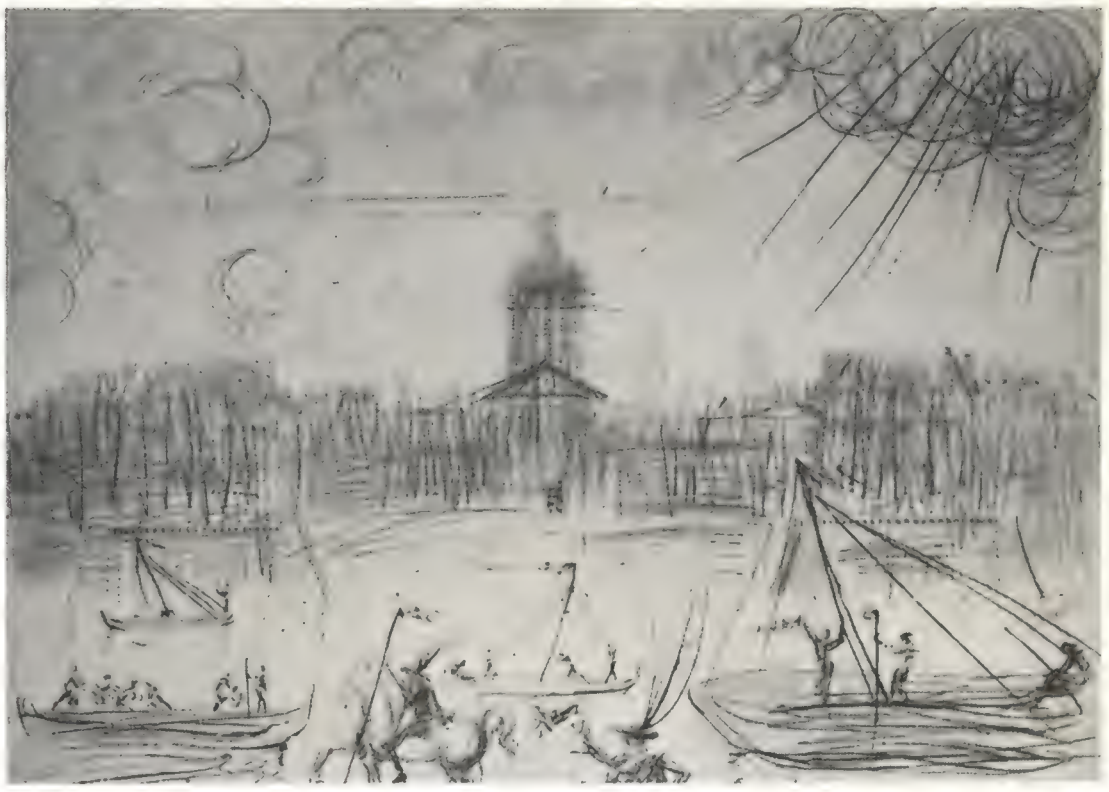
At the Original Print Collectors Group, we sell only fine original works to a growing number of people who are enthusiastic about buying good art at moderate prices.



Pop artist Peter Max assumes a new style in his latest lithograph, "Spring Bouquet." Signed edition of 300.

One of our primary concerns is to educate our customers, so that they'll be able to discriminate and get true value for their money.

"Academie de France," original hand-colored etching by Salvador Dali. Signed edition of 100.



Is the edition limited and is the print numbered?

Did the artist personally sign the individual work?

A few pointers, then about original prints:

Original prints, whatever the process used to create them, are "hand-pulled" under the artist's supervision, or by the artist himself. This means that any work produced photographically or by another purely mechanical process is not an *original* print.

If you examine a print under a magnifying glass and discover a regular pattern of small dots, you will know immediately that it is not an original work.

If the print is a serigraph (produced by a silkscreen process), the ink will seem rather like paint and appear to be sitting upon (rather than absorbed into) the paper.

Etchings and engravings will produce a physical impression on the paper itself.

Contemporary original prints will always be signed in pencil by the artist himself, to indicate personal supervision and approval of the individual print.

Original prints are always produced in limited editions, at the most several hundred copies. If thousands of copies are available, then the work is almost certainly *not* original. (In most cases, to assure that the integrity of their work is not violated, artists will destroy the plate after the edition has been produced.)

Cuca Romley's charming hand-colored etching, "Central Park." Signed edition of 125.

The print will have a figure on its border, indicating the number of prints pulled and the number of the individual print in the sequence.

For example, the figure 50/100 means that the edition has been limited to 100, and that this is the 50th print pulled.

There's a lot more to be learned about buying original prints, more than we can tell you on this page.

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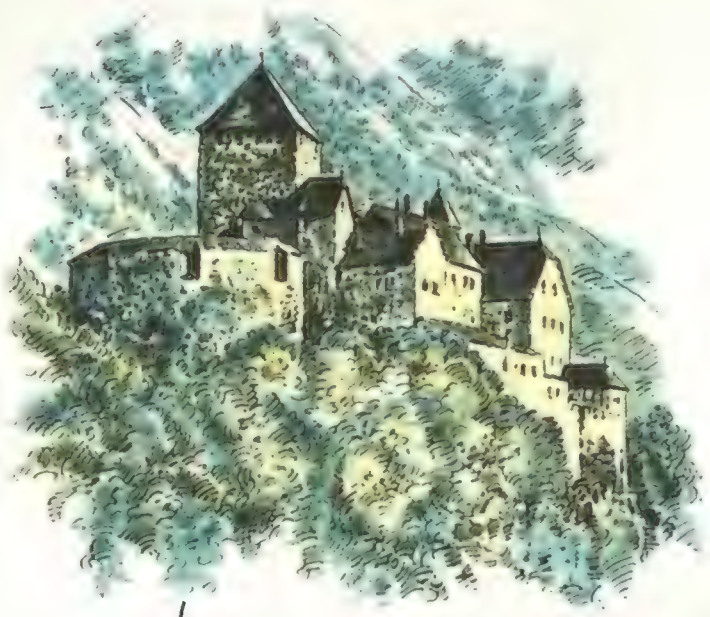

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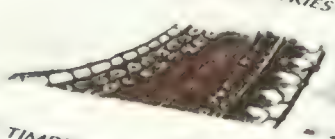

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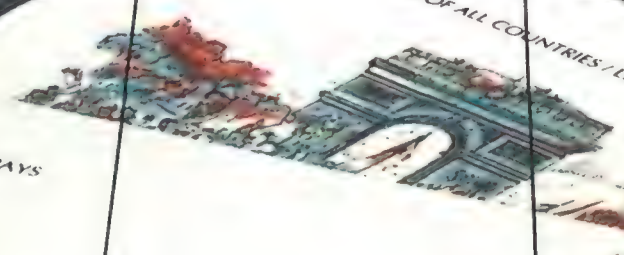

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The Stamps of All Countries First Day Cover Collection

an official issue of the International Society of Postmasters

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Original issue price: $4 per cover.

Subscription deadline: April 5, 1977.

The fascination of stamp collecting is endless. More than a century ago, a French Count set out to build a complete collection of every stamp in existence. Nearly sixty years later, he had amassed a collection valued at more than $1.6 million. But it still was not complete . . .

THE INTERNATIONAL SOCIETY OF POSTMASTERS, headquartered in Geneva, Switzerland, is the one organization that represents postmasters throughout the world. As a service to collectors, the Society has set itself a most ambitious goal—to issue the very *first* collection of First Day Covers bearing commemorative stamps from all countries of the world.

This will, unquestionably, be *the ultimate First Day Cover collection.* For it will contain a significant commemorative stamp issue from virtually every country in the world. And each stamp will be affixed to an engraved First Day Cover, with the official first day of issue postmark actually applied in the country of origin.

Thus, *The Stamps of All Countries First Day Cover Collection* will be as comprehensive as it is unique. Over 200 countries will be represented—every stamp-issuing country in the world with the exception of those few where First Day Covers are not available because of government regulations.

The collection is being issued *once* and *once only,* in strictly limited edition. It is available only by advance subscription, with a firm limit of one subscription per person. And the world-wide closing date for all subscriptions is April 5, 1977. After that date, *this collection will never be offered again.*

Outstanding First Day Covers from every part of the world

These First Day Covers will come to you from every corner of the world. Each stamp will be an outstanding work, created by the issuing country in tribute to its national heritage. And each stamp will be officially postmarked in its country of origin, at the officially designated Post Office of First Issue, with the First Day cancellation that makes the cover an authentic and coveted collector's item.

At this very moment, in fact, representatives of the International Society of Postmasters are working in many countries to make the arrangements that will enable you to acquire and own this extraordinary collection.

For this is a collection that would be almost impossible for any one person to build on an individual basis. It is the most significant and impressive series of international First Day Covers *ever* issued. It is a collection that will be a joy to own—bringing you, each month, significant new commemorative stamps on specially engraved First Day Covers of incomparable quality. Month by month, you will be building a personal collection of First Day Covers from around the world.

Works of beauty, status and significance

As astute collectors well know, the First Day cancellations that will be applied to these covers are extremely important. For they are universally recognized as official certification of the special First Day of Issue status of both the stamp and cover.

Moreover, each cover will be an *official issue* of the International Society of Postmasters, and will bear an original work of art created exclusively for this collection by a noted artist. Each work will be the artist's own interpretation of the same theme as the accompanying stamp. Thus, the cover will both complement and enhance the stamp design.

Invitations to create these works of art are now being extended to the artists of many nations. In many cases, the engraved design will be created by an artist of the same country that issues the stamp.

In addition, each cover can be *individually personalized* with the name and address of the subscriber—or the name and address of any other person the subscriber may designate. And the reverse of each cover will bear a Certificate of Authenticity, attesting to the special First Day status of the stamp, the postmark and cover.

To house and protect your complete collection of approximately 200 First Day Covers, you will receive a *matched set* of two specially designed handcrafted display albums. With each cover, you will also receive a deluxe reference page, providing significant information about the country, the stamp, the cover and the cachet design.

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This comprehensive collection of international First Day Covers is one of the most significant and important undertakings in the history of stamp collecting. For each subscriber, the thrill of receiving these covers from the far corners of the world will be matched only by the fascination of acquiring so complete and beautiful a collection. And by the satisfaction of sharing this collection—and the knowledge it brings—with one's children and grandchildren throughout the years to come.

Subscription deadline: April 5, 1977

The International Society of Postmasters has authorized The Franklin Philatelic Society, the international stamp division of The Franklin Mint, to handle the processing of all subscriptions and shipment of the First Day Covers in this unique collection. Your application should therefore be mailed directly to The Franklin Philatelic Society, Franklin Center, Pennsylvania 19091, by the subscription deadline of *April 5, 1977.*

Because the supply of stamps available to the International Society of Postmasters for this collection is limited, the Society must reserve the right to close the edition even *before* April 5. Subscription applications will be accepted in sequence of receipt. It is therefore suggested that you enter your application promptly.

A handsome matched set of two display albums will accompany each collection.

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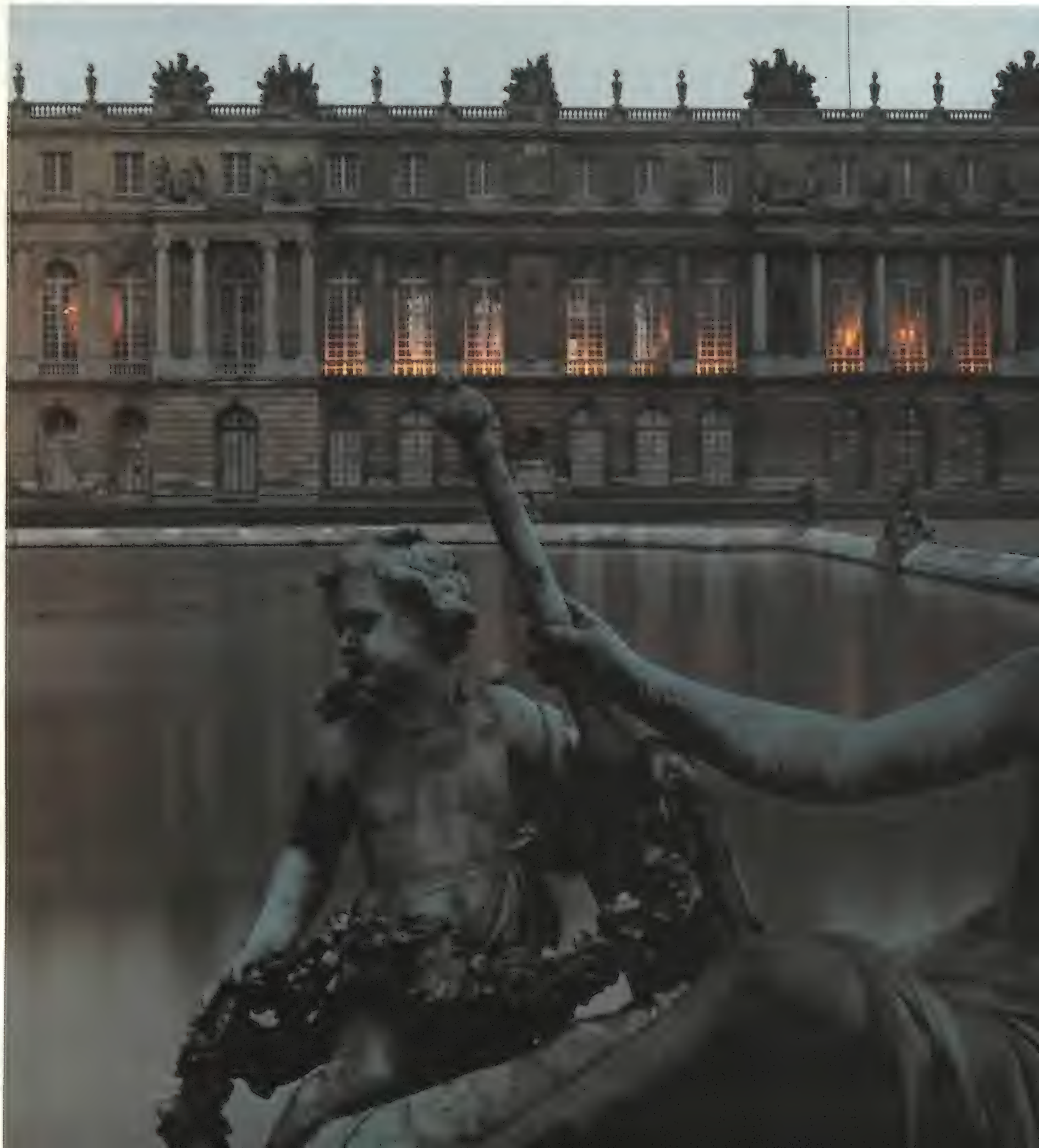
Commoner with lordly air is bringing Versailles back to its days of glory

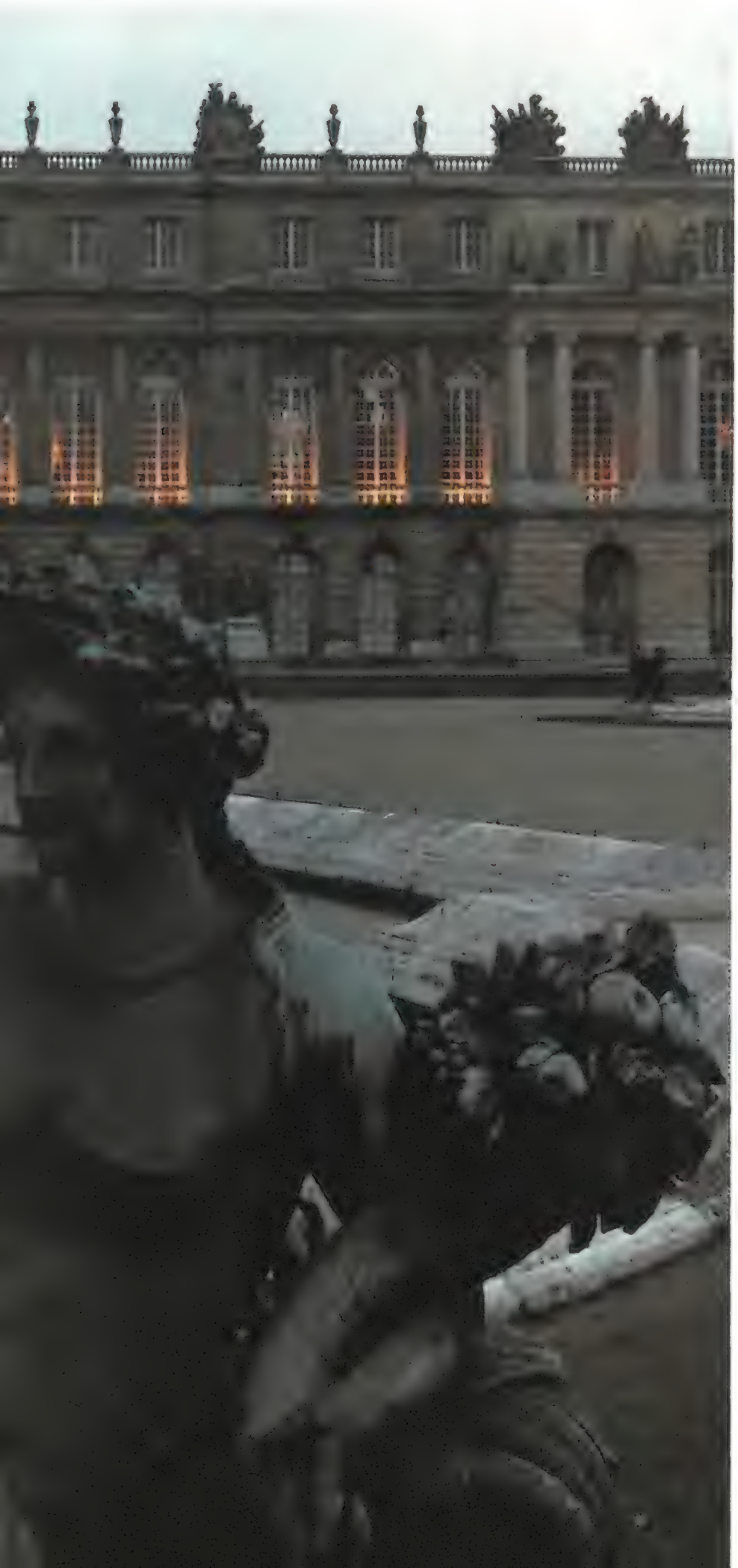


By Robert Wernick

Photographs by Pierre Boulat

Gérald Van der Kemp is boss of the Sun King's palace today and is passionately dedicated to putting things back to what they used to be

Article begins on following page



As twilight deepens, one of history's most sumptuous piles and enclaves is photographed from gardens, lighted up as if for a dead king's ball or as they once were for World War I peace deliberations. Behind winking windows is the Hall of Mirrors where once stood an ornate row of 24 torchères (above), of which four survived. Replicas are being fastidiously made.

This theatrically opulent extravaganza was the queen's bed. The canopy is of carved and gilded wood and this counterpane covered Marie Antoinette on her last night in Versailles.

His title is Chief Curator of the museums of Versailles and the Trianons, which makes him a civil servant of the French Republic. But, with his lordly port, his craggy face and his air of authority, Gérald Van der Kemp (p. 47) might well pass for a ruling Bourbon. For the last quarter of a century he has been the boss of the great sprawling chateau and its acres of dependencies, gardens, fountains, ponds and forests. And it is largely through his personal doing that Versailles has begun to sparkle again.

Unlike the Bourbons, Van der Kemp was not born to magnificence. In the late Thirties he was a student painter in Paris, with no more capital than a degree in art history. In 1936, he found a job in the Ministry of Fine Arts. By 1940 he was in charge of the chateau of Valençay near Tours, Talleyrand's old home, where, among other treasures, most of the sculpture of the Louvre had been stored to keep it out of the way of the war. The war was now very close; columns of German troops passed eastward through Valençay, racing to escape Patton's tanks. One day it was an SS division coming up from the southwest. The Germans stood Van der Kemp against a wall and told him they had information that three German soldiers killed by the French underground had been buried on the grounds. They were going to shoot the staff and set fire to the chateau.

Van der Kemp used the powers of persuasion for which he has since become famous. Destroy this place, he said, and you will be destroying perhaps the greatest repository of art and civilization the Earth has ever seen. The Venus de Milo, the Victory of Samothrace, uncounted world-famous masterpieces. More to the point, he added: the minute Hitler hears of this—he is a great admirer of classical antiquity, you know—he will have you all shot. They let themselves be persuaded and took off, leaving the chateau intact.

A grateful government gave him the ribbon of the Legion of Honor and a job at Versailles. When the curator-in-chief died in 1953, he succeeded to the post. He was ready now to devote himself to the task of restoring the magnificence of what years of neglect and misguided ideas had dimmed and diminished.

Ever since Napoleon's day it had been agreed that Versailles should be restored, but how? Everything connected with it was a problem, and the problems had found no satisfactory solution for 150 years. In the first place, just what was to be restored? And to what period? Versailles was not built as a museum, all of a piece; it was a living, continually changing place.

Its genesis dates from an evening in 1661 when the young king, Louis XIV, was invited to a fete in his honor at Vaux-le-Vicomte, a sumptuous chateau of breathtaking elegance built by his superintendent of finances, Nicolas Fouquet. Louis was frankly envious. He also calculated, correctly, that his superintendent of finances must be stealing him blind to afford such luxury. He clapped Fouquet into a dungeon for the rest of his life, but retained his stable of architects, artists, decorators and gardeners.

In swampy country southwest of Paris, the king's father, Louis XIII, had built a glorified hunting lodge, where he could pass the night without having to ride all the way back to the city after a day in the fields. Around this, the young king proposed to build the biggest and most magnificent palace the world had ever seen. It was to be not merely his home, but the capital of France. In terms of modern Washington, D.C.—another planned capital built on swampy soil—it was to be White House, Pentagon, Smithsonian Institution, society ballroom, National Gallery of Art and Kennedy Center all rolled into one. And such it

With a staff of nine, it took Mme. Brocard nine years to re-create embroideries in Queen's bedchamber.

Robert Wernick is interested in French culture and history and lives, appropriately, in Paris.

Restoring the grandeur of Versailles

On the ceiling of the *Salon d'Hercule,* covering 373 square yards: LeMoyne's *Apotheosis of Hercules.*

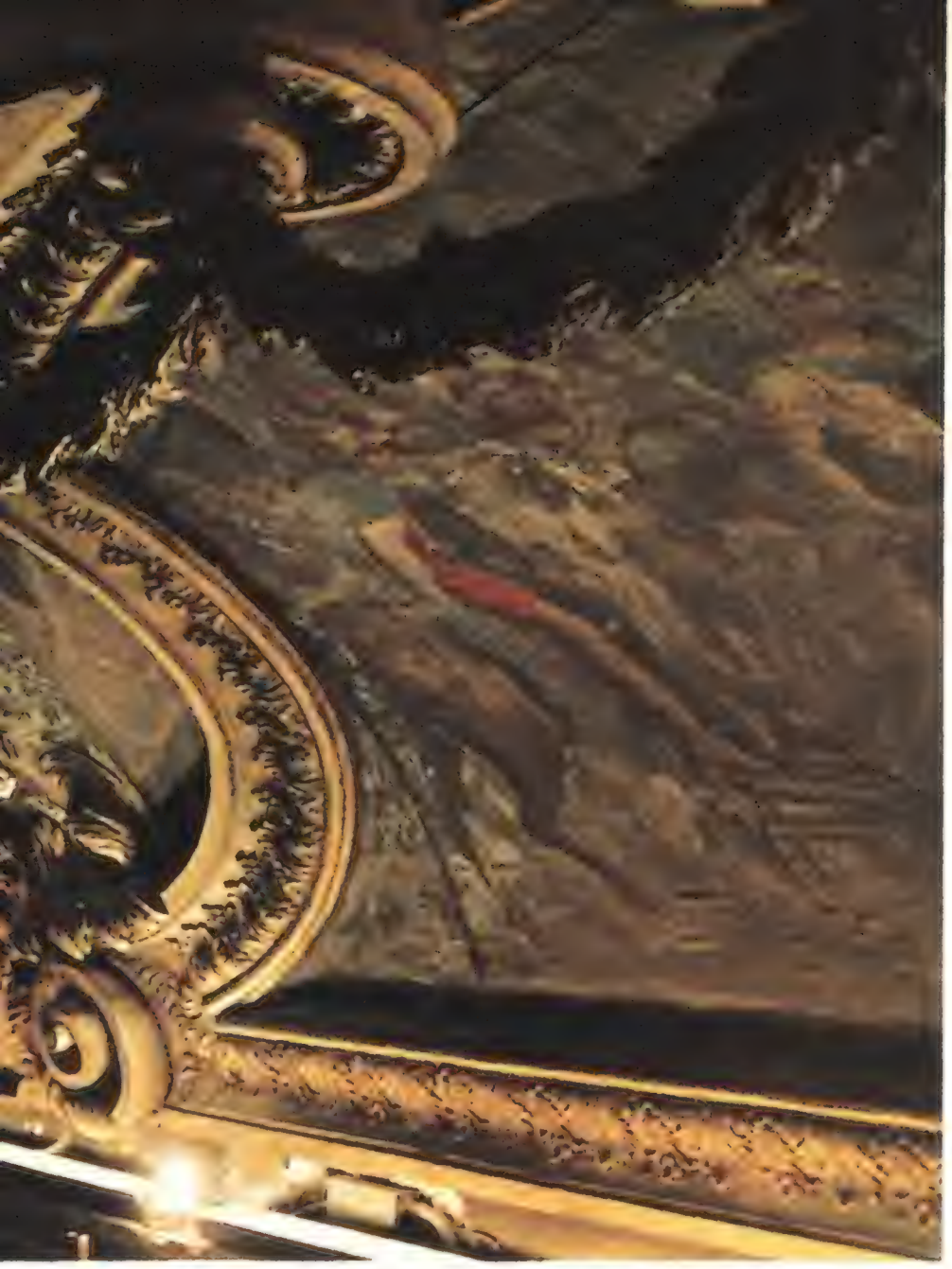
Pierre Antoine Paulet, 82, arrived in 1940, has since restored most of the paintings in Versailles.

was, for more than a century after Louis XIV moved the court into the structure in 1682. The courtyard of Versailles was always full of carriages coming and going, the halls were always full of people on missions of business or pleasure or simply gawking at the decorations. For Versailles was a public place; the great iron gates were never closed.

Whims and fashions changed the shape and appearance of the palace from year to year, sometimes from day to day. Louis XIV, like his great-grandson Louis XV and the latter's grandson Louis XVI, was always tinkering with plans and decorations, tearing down walls and partitions, adding windows or balconies or staircases, ordering new furniture, new hangings.

Much of the old furniture and decorations simply could not be restored because they had disappeared. In Louis XIV's great days, the state furniture of Versailles was all in massive silver—tables, armchairs, mirrors, sconces—hundreds of pieces. All of these objects, superb examples of the silversmith's craft, were melted down in 1690 to help pay for the king's wars and replaced by intricately carved and gilded wood.

Versailles was a symbol of all the Revolution was



He surveys ceiling painting, *Augustus Ordering the Construction of the Port of Misenum.*

against, and the Revolution stripped it bare. Its art treasures—the Mona Lisa, the Titians, the Rubenses and all—were carted off to the Louvre or to other museums. The tapestries were burned to recover their gold and silver thread. The furnishings were more or less honestly inventoried; some of them were put in storage and some were sent to various government buildings, but the great majority were put up for public sale. So anxious were the new leaders to see the last of Versailles that they let foreigners buy up objects from the palace tax free, and astute buyers came from all over Europe, and from as far as New Orleans, to snap them up. Much of Buckingham Palace is a legacy of the taste of the then Prince of Wales, later George IV, whose agents took away shiploads of treasures.

Some of the revolutionists would have been pleased to burn Versailles to the ground. Napoleon, who succeeded them, had other ideas. He was anxious to refill the vast empty shell, and he spent a fortune keeping the walls and roof in repair. But refurnishing would have cost as much as a war, and wars came first.

For the next century, France had ambiguous feelings about Versailles. For some it was a symbol of the glory of the old regime; for others it was a symbol of decadent tyranny. King Louis Philippe, who came to the throne after the revolution of 1830, got the idea of turning Versailles into a unifying force by making it a museum dedicated, as bronze letters still announce on the facade, to "All the Glories of France." He saved the building from falling into ruins. He also remodeled it, changed its character, squeezed out what was left of its soul. The elegant 18th-century decorations that remained seemed impossibly frivolous to the taste-makers of the 1830s and '40s. Some delicately carved panels in their subtle pastel shades were turned around to face the walls, and the rooms redone in a pale gray which was the height of fashion then and seems impossibly dumpy today. What was left of the old decorations was ruthlessly repainted. The walls were hung with hundreds of historical paintings, mostly of French victories, by the leading painters of the day. For a century and more this was the Versailles that tourists saw.

Curators, notably Pierre de Nolhac, did their best, but the building was running down fast. Only a timely grant from John D. Rockefeller jr. in the 1920s saved the roof of the Hall of Mirrors, which was threatening to crumble away.

A restorative formula

When Van der Kemp took over, he decided that it was impossible to undo the work of Louis Philippe entirely. He would maintain the museum, keep the paintings, but dispose them more rationally, and redecorate the rooms in which they hung with 18th-century tapestries to take away the cold gray museum look. In addition, he would restore the principal apartments in the center of the chateau to re-create, as far as possible, the atmosphere and the life-style of the 17th and 18th centuries. If any of the original furniture and decorations could be found and refurbished, so much the better. If not, equivalent pieces from the same period would do. If there were not enough of these, then imitations, based on surviving fragments or old descriptions, would be made by artisans trained in the traditions of the old crafts. Thanks to old inventories and modern research it was possible to know what had been where originally. Laying hands on the objects was another matter. The Louvre was not going to give up the Mona Lisa (in fact, it was not disposed to give up anything), but Van der Kemp pulled the proper strings and a number of valuable, if less celebrated, paintings and sculptures were pried loose. The richest prize was a huge Veronese, *Christ at the House of Simon the Pharisee*, which the Republic of Venice had given to Louis XIV. To serve as a proper setting for this masterpiece, he ordered a chapel re-

placed with what is now one of the principal rooms of the palace, the Salon d'Hercule. The work was carried out under Louis XV, and included a splendid ceiling painting—*The Apotheosis of Hercules*—by François LeMoyne, who worked for years to achieve something that could stand beside the grandeur and opulence of the Veronese. The LeMoyne painting was in place and needed only to be cleared of two centuries of dirt and varnish to shine again in its original freshness, but the Veronese was irreplaceable. Finally, the Louvre consented to let it go, and it was moved over to Versailles and replaced in the magnificent frame that Louis XV had originally ordered for it.

Other treasures were found in a variety of caches. Some had simply been put in storage in the 18th century and were still on hand. Some were acquired by exchange with museums, were bought or were gifts.

Funds were always the problem. What money was allocated to Versailles went largely to its physical upkeep, to installing central heating, repairing the miles of pipes that feed the ponds and fountains, and plastering the cracks in walls, all of it the inevitable result of 300 years of neglect.

With what money was left over, Van der Kemp mobilized a small army of master craftsmen from the dwindling band of highly skilled *artisans de luxe* who were one of the glories of France in Louis' day and are still probably the best in the world. Fungus and rot had to be scoured out. Moth-eaten curtains had to be mended. New hangings, bedspreads, chair covers had to be woven, embroidered or stitched in workshops that had changed not at all, except for the introduction of electric light, since the chateau's palmy days. A staff of nine seamstresses under Madame Brocard—82 years old and head of a business which is now in its third century—worked nine years to re-create the embroideries in the queen's ornate bedchamber.

Another side of the queen's bedchamber.
Bust is of Marie Antoinette by Félix Lecomte.

Reflected in the mirrored wall is chandelier of crystal set in silvered and gilded bronze.

Bust of Louis XIV is in place today in apartment of Mme. de Maintenon, his straitlaced second wife.

Mme. de Maintenon's lavish sitting room with grand gallery of aristocratic court ladies.

Every room in the palace takes years of work to restore. Some might have taken decades if a short cut had not been found. In the great Hall of Mirrors, for example, there once stood 24 torchères, carved and gilded life-size figures which held flaming torches. Only four of the originals have survived. There are not enough skilled craftsmen left to carve replicas in several lifetimes. A solution was found by the father-and-son molders, Léon-Paul and Paul-Henri Berthaut, who are currently making replicas in plastic which, when polished and gilded, look just like the originals. The secret was a polyester mold, which can be applied, then peeled off the statue in one operation; to make traditional plaster casts of these contorted figures would have demanded hundreds.

Some crafts were all but dead. Van der Kemp wanted a living museum, and one way to give the impression of life was to keep all the clocks ticking. But who could repair and adjust and keep in working order all the intricate marvels of the 18th-century clockmakers? One man could do it: Pierre Bécard, a crusty old gentleman now in his eighties. He never takes a vacation, for fear one of his beloved clocks, each of them representing months or years of work, will run down, and he regularly walks miles of parquet floors to wind up the delicate mechanisms he has rescued.

M. Bécard loves his work so much he refuses to be paid for it. But others equally devoted to Versailles cannot be so disinterested. Someone has to pay men like Pierre Paulet, who came to Versailles for a two-week job in 1940 and is still repairing pictures 36 years later. He is currently working on ceiling paintings that go back to Louis XIV, and on one of Louis Philippe's showpieces, *Taking of the Smalah of Abd-el-Kader,* 56 feet long. Someone has to pay the sculptors, the casters, the gilders, the locksmiths, the braid-makers, the cabinetmakers, the master weavers who reactivated the old wooden looms of Lyons, working with the finest Chinese silks in fantastically complicated patterns which sometimes cannot progress faster than a couple of centimeters a day.

It was soon apparent to Van der Kemp that his skimpy government funds would not keep all this work going. He had to turn to the private sector. Unfortunately, the private sector in France, though well endowed with both funds and objets d'art, is reluctant to attract attention by making public donations.

In the United States, on the other hand, the government gives tax advantages for personal donations to museums, and it was there that Van der Kemp turned. His first coup was in 1949, when he was invited to an evening at the home of the famous society hostess Lady Mendl, who had another guest she was sure he would like—Barbara Hutton. They were soon on first-name terms. About three in the morning, the conversation turned to Marie Antoinette; Van der Kemp remarked casually that Miss Hutton was the owner of a magnificent Savonnerie carpet which had belonged to the unfortunate queen. Didn't she think the rug really belonged back in the Queen's apartment at Versailles? Of course, said Barbara; it would be much better than in a New York warehouse.

This was the opening of a flood of donations from overseas, much of it from the United States.

Versailles will probably never be entirely completed. But Van der Kemp hopes that before he retires (he is 65 now) at least the central part of the giant structure will be restored. He hopes also to make a good beginning on the nearby Petit Trianon, a sort of toy palace used to get away from the stifling round of protocol and etiquette at Versailles, which even Louis XIV sometimes found too much for him. Louis XIV's idea of intimacy, the Grand Trianon—also nearby—was still pretty overwhelming for his successor's taste. Louis XV therefore commissioned a new and smaller building, the Petit Trianon. It reflects the taste of his mistress the Marquise de Pompadour. Unlike the old king's lady friends, whose interests ran to sex, gossip or religion, Pompadour had a finely developed taste for all the arts, and the design of the Petit Trianon proves it in every charming detail. It is the only building at Versailles where the rooms are obviously built to be lived in rather than to be displayed. Nothing remains of the furnishings of the Pompadour period, but Marie Antoinette loved the Petit Trianon, too, and a couple of rooms have already been restored.

The work continues.

The very model of a modern major rehabilitator, Van der Kemp joins wife in their Versailles apartment.

By Maisie and Richard Conrat

How U.S. farmers became specialists –in cash and debts

Great machines powered by horse and steam (and an almost endless expanse of land to work) brought bigger markets and profits as well

© 1977 Maisie Conrat and Richard Conrat

By the end of the 19th century, American agriculture had undergone a fundamental transformation. Throughout large regions of the country the self-sufficient, diversified farm of the past had given way to specialized, more commercialized farming. The traditional husbandman who produced small surpluses and depended little upon cash income had been supplanted by the farmer who concentrated on the production of one or two staple commodities.

Industrialization and urbanization had provided farmers with expanding markets for their produce. The invention and proliferation of horse-powered and steam-powered machinery was enabling farmers to plant and harvest ever larger acreages. The rapid spread of transportation lines across the nation al-

An eastern Washington field, 1900: harvesters on rolling hills, drawn by as many as 40 horses, covered 35 to 40 acres a day. Each cut a 16-to-18-foot swath, cutting grain and bundling it in one operation.

lowed crops to be shipped to markets thousands of miles away from the farm.

Increasingly, farming was being viewed as a business enterprise rather than merely as a means of existence. And the life of the farmer and his family was becoming ever more dependent upon the market economy and the cash system.

As early as the 1830s, growing urbanization in the Northeast had made a substantial impression upon the nature of agriculture in that region. In the immediate vicinity of burgeoning factory towns and commercial centers, farmers were concentrating their energy upon supplying local markets with fresh vegetables, fruits and dairy products. In outlying districts, farmers had begun to specialize in the raising of beef or pork, or in the production of wool for the region's new textile industry. Farmers who participated in this commercial economy soon abandoned the old practice of home manufacture which, in the past, had been an inseparable part of farm life. Store-bought cloth replaced homespun, and factory-made furniture and farm tools were substituted for homemade ones.

By 1840 the expanding urban centers of the Northeast were being supplied not only with produce from Eastern farms, but also with produce from farther west. A steady stream of Western wheat, beef, pork, wool and cheese was flowing into Eastern markets. Some of this produce had been moved down the Mississippi River by steamer, then shipped up the Eastern Seaboard to Philadelphia, New York, Boston and

Moorhead, Minnesota, in 1879: wagons loaded with sacks of wheat in line to unload at an elevator.

other ports. A larger portion had come by way of the Great Lakes and the Erie Canal. In the following decade the flow of Western goods would continually swell as a network of railroad lines spread through the new states, connecting areas previously cut off from markets. In 1850 there were only 9,000 miles of railroad track in the country; no more than ten years later there were 30,000 miles.

By the middle of the century, Western farmers were finding a steady market for their goods in Europe, as well as at home. Rapid industrialization in Britain and on the continent had created huge urban populations and an increasing demand for cheap foodstuffs. In 1850 the United States exported 11 million bushels of wheat and three million bushels of corn. During the next decades exports would climb to higher and higher levels. By 1897, wheat exports had risen to 217 million bushels and corn to 212 million. In peak years, one-third of the United States wheat crop was shipped abroad. Meat exports, which had been relatively insignificant before the Civil War, amounted to $179 million a year by the end of the century. Like the cotton farmer of the South, the Northern grain or livestock farmer had become vitally dependent upon foreign markets.

The continuing spread of railroad lines across the nation tended to encourage the growth of specialized agricultural regions. With transportation readily accessible, regional self-sufficiency was unnecessary, and farmers devoted themselves to the production of those crops which would yield the highest possible profits in their particular area of the country. The production of wheat became the paramount concern throughout vast regions of the North Central states and later in parts of Kansas, the Dakotas, Oklahoma and Texas. As the frontier moved westward, the center of wheat production followed close behind, always gravitating to the cheap virgin lands to the west. At the same time, the nation's Corn Belt was taking shape. By the 1870s, farmers in the prairie region of the Midwest had found that their rich soil and moderately humid climate were ideally suited to the production of corn. They also found that the combination of hog production and corn growing would yield maximum profits.

All over the country, farmers were seeking out specialties which were particularly adapted to their region or locality and which promised to be most remunerative. New England farmers, unable to compete with the West in the production of meat, grain or wool, concentrated their energy on highly perishable commodities—milk, vegetables and fruit. Many New England dairymen gave up growing their own feed, finding it more economical to buy corn from Indiana and Iowa. The settlers who poured into Oklahoma, after the opening of the territory in 1889, soon began to grow huge quantities of cotton, knowing that their new fertile lands would far outproduce the depleted soils of the old Cotton Belt. In certain localities of California, Oregon and Washington, growers plunged headlong into the production of hops for making beer. By 1890, two Washington counties alone were producing about seven million pounds of hops annually.

Of course, agricultural specialization was far from universal by the end of the 19th century. Throughout large sections of the country general farming still predominated. And in all the major crop regions, old-fashioned diversified farmers, who grew a little of

everything, were interspersed among the increasing single-crop farmers.

Nevertheless, the national trend was definitely away from general farming. Farm journals, agricultural societies and agricultural educators all encouraged farmers to become more businesslike in their practices. It was urged that the farmer, like the manufacturer, specialize his operation and learn to keep a keen eye on the market. Rather than attempt to meet all his family's food needs as the husbandman of the past had done, the farmer was advised to direct his attention to producing one or two market crops and maximizing his cash income.

As early as the 1850s, the president of the New York Agricultural Society was enthusiastically expounding upon the great economic advantages of specialized commercial farming. Comparing old modes of farming with new, he stated: "At an early period 'production for self consumption' was the leading purpose; now no farmer would find it profitable 'to do everything within himself.' He now sells for money, and it is [in] his interest to buy for money, every article that he cannot produce cheaper than he can buy. . . . His farm does not merely afford him a subsistence; it produces capital. . . .

"An extended cash market also enables him to simplify his processes. He can now take advantage of the principle which lies at the foundation of success in commercial and manufacturing pursuits, of 'doing one thing; doing it extensively and well.' "

In 1868 the *Prairie Farmer* echoed these views, telling its readers: "The old rule that a farmer should produce all that he required . . . is part of the past. Agriculture, like all other business, is better for its subdivisions, each one growing that which is best suited to his soil, skill, climate and market, and with its proceeds purchase his other needs."

In the years that followed, the inclination on the part of farm journals and agricultural educators to treat farming solely as a business enterprise would grow steadily stronger.

During the second half of the century, American production of food and feed crops rose at an almost unbelievable rate. Corn production increased by four-and-a-half times, hay by five times, oats and wheat by seven times.

The most crucial factor behind this phenomenal upsurge in productivity was the widespread adoption of laborsaving machinery by Northern farmers. By 1850, horse-drawn reaping machines were being introduced into the major grain-growing regions of the country and horse-powered threshing machines were already in general use. However, it was the onset of the Civil War which provided the great stimulus for the mechanization of Northern agriculture. With sons and hired laborers inducted into the army and grain prices on the rise, Northern farmers rushed to avail themselves of the new laborsaving equipment. In 1860 there were approximately 80,000 reapers in the country; five years later there were 350,000.

After the close of the war, machinery became ever more important in Northern agriculture, and improved equipment was constantly introduced. By 1880, a self-binding reaper had been perfected which not only cut the grain, but also gathered and bound the sheaves with twine. Threshing machines were also

Kansas, 1890s: 10,000 bushels of corn are dumped into a farm family's cribs. In that decade a shucking and fodder-shedding machine came along; it took cornstalks in, spewed cleaned ears out.

The Red River Valley, North Dakota, in the 1880s. Farmers turn out for a display of their steam tractors

being improved and enlarged, and after 1870 they were increasingly powered by steam engines. Since steam-powered threshing outfits were costly items—running from $1,000 to $4,000—they were usually owned by custom threshers who worked their way from farm to farm during the harvest season. Later, "combines" came into use on the great wheat ranches of the Pacific Northwest. These ponderous machines—at first pulled by as many as 40 horses—reaped the grain, threshed it and bagged it, all in one simultaneous operation.

During this period, an endless procession of other new implements was coming onto the market—riding plows with multiple shares, grain drills which both planted and covered the seed, hay mowers and sulky hay rakes, two-row corn cultivators, disk and spring-tooth harrows, to name a few.

The adoption of laborsaving machinery had a profound effect upon the scale of agricultural operations in the Northern states, allowing farmers vastly to increase their crop acreage. By the end of the century, a farmer employing the new machinery could plant and harvest two-and-a-half times as much corn as his grandfather had done using hand methods 50 years before. He could produce seven times as much hay and nine times as much oats. While a farmer and his son in the 1830s could plant and harvest a maximum of approximately 15 acres of wheat, by the 1890s two men with the aid of machinery could handle more than 250 acres of wheat.

During the last decades of the century, the amount of capital which Northern farmers invested in machinery continually increased. Between 1860 and 1900, annual sales of farm equipment rose from $21 million to $101 million. Much of the machinery purchased during the period was bought on credit. In their eagerness to secure equipment, many farmers went so far as to mortgage their farms or even their livestock. Such risky investments were viewed with great skepticism by more traditionally-minded farmers. In a letter to the *Kansas Gazette* in 1877, one critic warned: "Farmers, beware of where you are drifting! Too much land and machinery will ruin you financially—destroy your credit at home and abroad. . . . Contemplate now the situation! Our country literally covered over with machinery, and our Recorder's office fast filling up with mortgages."

Whether they wished to or not, however, many farmers felt they had little choice but to go into debt in order to obtain equipment. Machinery had become an economic necessity in the new commercial agriculture, and if a man wished to compete in the market he was obliged to get the necessary tools—even if it meant mortgaging his farm.

Historically, the American farmer, both in the North and in the South, had always been notorious for his practice of "land-skinning." Since land was abundant, fertile and relatively cheap, the farmer had found it easier and more profitable to take up new land than to conserve the resources of the old. When agriculture was basically of a subsistence nature, soil

This is adapted from The American Farm, *to be published this month by Houghton Mifflin Company. Mr. and Mrs. Conrat live in Healdsburg, California.*

and threshers. The machines, introduced in 1870, were approaching 1,000-bushels-a-day capacity.

Nebraska, 1892: a farmer and his family in the front yard of their better-than-average frame home.

exploitation had been limited to comparatively small pieces of land. But when new machinery enabled the farmer to enlarge his acreage and expanding markets stimulated him to greater production, the mining of the soil proceeded on a grander scale.

In the North, the wheat farmer mined his soil as thoughtlessly as the cotton farmer had in the South. In frontier regions, one wheat crop was planted after another until the natural fertility of the land gave out. Reports from the new western lands always told the same story—first a few years of stupendous yields, then a gradual decline. The great Wisconsin wheat boom was followed by the Minnesota wheat boom, then the Dakota wheat boom.

Of course, in every region there were always a few farsighted and conscientious men who objected to this habitual soil abuse. In 1857, one Illinois farmer declared: "It is true that us western farmers have been skinning God's heritage, taking the cream off, and leaving for parts unknown, until humanity has a heavy bill against us for wasting the vital energies of mother earth."

There were other men who believed that it was foolhardy to depend solely upon a single cash crop. In 1874 the editor of one Minnesota newspaper pointed out that the farmer who relied heavily upon wheat was taking a chance on weather, prices, disease, insects and other unpredictable factors. "Don't risk your *all* on wheat," he argued. "Raise corn and hogs, oats, barley, hay, flax, potatoes, sheep, cattle, poultry, bees, anything that is profitable so that if any one of these calamities befall you . . . you may have some other reliance to depend upon."

Such advice, however, was rarely heeded until farmers began to feel the pinch in their pockets. When wheat yields finally declined to uneconomic lows, farmers would reluctantly adopt soil-building practices or, later, use fertilizer. Or they would sell out and move on to the fertile virgin lands farther west.

The increasing commercialism of American agriculture during the last part of the century reached dramatic heights in the development of the famous bonanza farms. The best-known of these mammoth wheat farms were located in the Red River Valley region along the Minnesota-North Dakota borders and in the Central Valley of California. The owners of these huge agricultural enterprises were often absentees, Eastern capitalists or Western investors who entered into farming on a speculative basis and who hired professional managers to oversee their agricultural operations.

The scale of production on these giant wheat farms was truly astounding for the time, each farm having thousands of acres under cultivation. During a peak year, one bonanza enterprise was reported to have had a total of 50,000 acres planted to wheat. The harvest-

ing of such extensive acreages required an enormous investment in machinery. A few of the bonanza operators owned as many as 100 reaping machines and 20 steam threshers.

The great bonanza farms were the object of much public attention and excitement. Countless articles about them appeared in newspapers and popular magazines. Farm machinery companies boasted in their advertisements that certain operators employed only *their* equipment. Writers emphasized the technological achievement which bonanza farming represented and the enormous profits which owners reaped. "Behold the working of this latest triumph of American genius," declared one writer in describing a bonanza harvest scene. When President Hayes, in 1878, toured one of the most famous of the Red River Valley farms, it was reported that the President "freely expressed admiration and astonishment at the magnitude of the operation."

Compared with the millions of small farms that were being established during the period, the bonanza phenomenon seems relatively unimportant. Yet the significance of these great wheat farms lay not in their numbers, but in the fact that they so boldly signaled the direction in which American agriculture was moving. Through farm journals, popular literature and machinery advertisements, the average farmer was being presented with a striking new image of what would constitute successful farming. And it was made clear that success lay in the direction of larger acreages, more equipment to work the land and greater specialization in crops.

During the last decades of the century, thousands of farmers and their families followed in the footsteps of the great bonanza farmers, hoping to reap small bonanzas of their own. Throughout the Western states, scores of communities sprang up whose main purpose was to produce large quantities of wheat and whose existence was precariously balanced on the success or failure of this one crop.

In 1880 a Kansas farmer wrote: "Wheat is king in the county of Dickinson. It covers a larger area than any other cereal. And it excites more anxious thought from the time the seed is put into the ground till it is hauled to the elevator, than any other produce of the farm. This anxiety is not confined to the farmer alone. The mechanic, the merchant, the banker and the railroad corporations, all feel it and daily give expression to the feeling in the shape of the anxious enquiry: 'Is the wheat crop a failure this year?' " It was a question on which everyone's survival hinged, and not everyone was going to survive.

When the cash ran out

For a large segment of American farmers, specialized, commercial agriculture failed to bring prosperity. On the contrary, dependence upon cash crops and the fluctuating prices on international markets brought increasing insecurity, hardship and indebtedness.

During the last decade of the 19th century and the early decades of the 20th, mortgage indebtedness rose sharply, and there was a dramatic growth in the amount of farm tenancy in the country. By the end of the 1920s, a large percentage of the nation's farmers no longer owned the land they worked. Tenancy rates were exceptionally high in the specialized cash-crop areas of the country. In the eastern and western Cotton Belts, over two-thirds of all farmers were tenants, and in the wheat and corn belts, approximately two-fifths farmed land they did not own.

The Great Depression of the 1930s found American agriculture in a poverty-stricken condition—a large portion of the farm population having only a precarious foothold on the land.

In the crisis of falling prices, many farm families would lose even this unsteady hold. The continuing advance of mechanization allowed landlords in the South to replace many of their sharecroppers and tenants with tractors. The government's crop-reduction program also encouraged the displacement of tenants in the South. Drought and dust storms added to the distress of the Plains. By the end of the 1930s, half a million farm families, mostly tenants, had been forced off the land. A million more were barely hanging on—many temporarily in poverty.

Hop pickers in Oregon, c. 1899: the state led the nation with 82,300 bales (180 pounds each), then as now a main ingredient in brewing beer.

Fuel for the future—will America have enough?

Tell Congress what you think it should do to conserve and develop energy.

The page opposite belongs to you. Use it to spur Congress to enact a much-needed energy policy for our nation.

Tell your Congressman—in your own words and for your own reasons—what you think America must do to develop the energy we need for the future. Energy to keep our lights burning. Our homes heated. Our automobiles running. Our factories working.

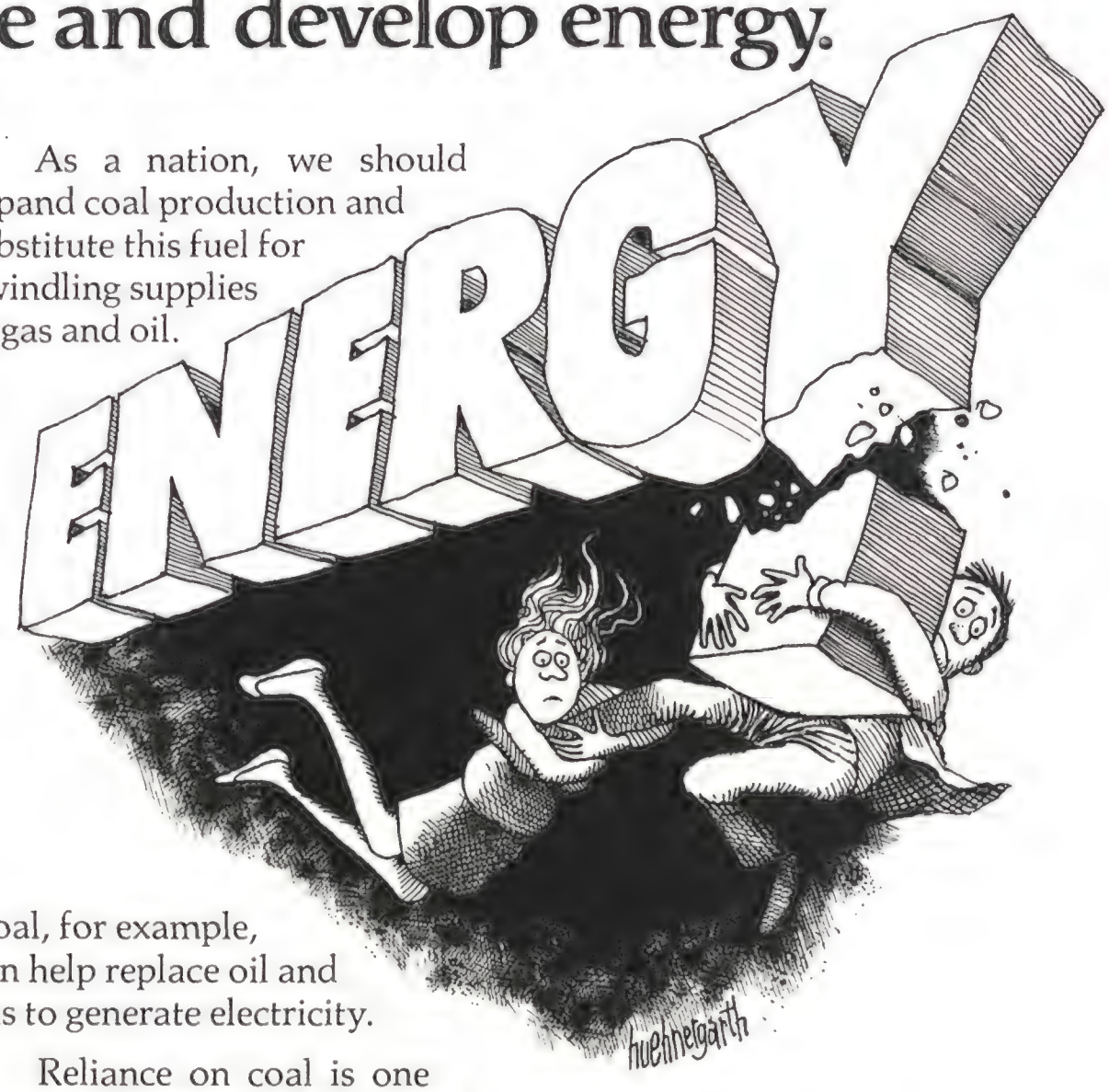
Conservation can help

All of us must seek new and better ways to save energy—right now and for years to come. But conservation is no cure-all. If America is to grow, and to become less dependent on foreign fuel, reliable sources of domestic energy must be developed.

Coal and nuclear power are practical answers

America sits squarely on top of one of the largest supplies of coal on earth—enough to last hundreds of years, even if we double or triple present levels of consumption.

As a nation, we should expand coal production and substitute this fuel for dwindling supplies of gas and oil.



Coal, for example, can help replace oil and gas to generate electricity.

Reliance on coal is one answer. Increasing the share of the nation's electric power that comes from nuclear energy is another answer. Without continued expansion of safe, large-scale nuclear power, there's a good chance America will face energy shortages year after year as demand rises.

Tell Washington to act

Your ideas on energy may differ from ours. What matters is that you let Washington know what you think. And that you want action.

Write your Congressman today. Your message—along with the messages of thousands of other voters—won't go unheeded.

Bethlehem BETHLEHEM STEEL

Honorable_____
House of Representatives
Washington, DC 20515

Dear Mr._____:

Sincerely yours,

Bethlehem Steel

By Rudolph Chelminski

The Lindberghs liberate monkeys from constraints

Given its druthers, Scott's and Alika's studies show, the simian is a choosy fellow—a gourmet, a high liver and a wary friend

Alika and Scott Lindbergh take the warming sun in front of manor, surely one of the coldest in France.

The early-rising howlers clambered grumpily up to the network of leafless branches at the summit of the oak next to their quarters, keeping a rendezvous with the first sun burning through the winter mist. Huddled motionless in silhouette against the icy brilliance of the sky, they looked to the casual visitor like so many squirrels' nests. Up close, though, they were yawning and scratching and thinking about breakfast. It was the beginning of another day at the Verlhiac Primate Center—one of the most personalized, innovative and sympathetic institutions of behavioral research anywhere in the world.

Scott Lindbergh had long since fetched the milk for himself, his wife Alika, the household cats and the monkeys. He was tramping across the meadow by now, rubber-booted against the heavy dew, binoculars at the ready. Every ten paces or so he stopped, and the herd of black-and-white Frisian cows watched him sweep the line of the woods at the end of the field with his glasses. He was curious to see how the rogue male was getting on.

"He's a black howler who doesn't have any females and is no longer attached to any group, so he stays out in the nature," he said, displaying a first-rate example of the Frenglish that inevitably stalks any Anglophone who has been speaking French too long (". . . *il reste dans la nature.*"). "Peripheral animals like this can find plenty of leaves and grasses and insects and things like birds' eggs in the summer, but of course in winter it's more of a problem. There are chestnuts and acorns and some grasses, like dandelions, but we supplement them by bringing him food from time to time. At first we had this anthropocentric tendency to bring the animals inside when the nights dropped below freezing, but now we let them decide. It's our basic premise that they know better than we do."

Female black howler with infant surveys countryside from vantage point on branch of century-old chestnut.

At length Scott located the monkey, an almost imperceptible splotch of black resting serenely in the crook of a chestnut tree. Like the others, he had abandoned active pursuits in favor of a sunbath. He seemed to be in fine shape.

"So far we haven't lost any animals," Scott went on. "But the place crawls with hunters at the beginning of the season. They shoot at absolutely anything. A friend of ours lost a peacock ten feet from his house. Monkeys are good at camouflage, though. A hunter really needs an eagle's eye to spot one around here."

Indeed. The Dordogne, home of foie gras, truffles, the Bergerac whence came Cyrano and the Les Eyzies cave drawings, has seen plenty of invaders in its long history, but not until recently had sober peasants thought to inspect the treetops for anthropoids.

Photographs by Pierre Boulat

The world's most pampered primates

Feeding time in the heated enclosure. Greenish teeth are not decayed, just covered by a leaf.

Scott and Alika Lindbergh's monkeys now number 37 and are steadily increasing with the years, thriving in the face of accepted zoological practice and a climate which any fool knows is completely alien to their kind. One reason they have survived might be that the Lindberghs decided from the first just to spoil them and observe the results. In one of two books she has already published on their enterprise, Alika boldly and insistently postulates that "a monkey must first of all be sentimentally happy."

Most of the monkeys enjoy unlimited egress from the main compound through a system of runways and Tarzan-style ropes to the welcoming oaks, sycamores, beeches and pines which spread out for nearly 100 acres around the Lindberghs' 17th-century manor. The only exceptions are the six woolly monkeys (*Lagothrix lagotricha),* judged too strong, too playful and too destructive for the manor's trembly old chimneys and roof tiles to bear. The woollies must content themselves with capacious outdoor cages, heated inner quarters, limited access four-to-six months per year to some trees surrounded by electric fencing, and all the food they can eat. And, of course, the Lindberghs' unbounded affection.

The roots of this unorthodox method reach back to Paris in 1967, when Scott, the youngest son of Charles Lindbergh, then a 25-year-old philosophy student in his final year at Cambridge, met the dark and demonstrative Alika, a nature-lover of Belgian passport and diverse talents. At the time of their fateful encounter, Alika had already established a solid reputation as a movie actress, had written four novels and painted innumerable canvases. But, more important, she had owned two monkeys. By the time they were married, Scott had succumbed to their charms, as well. Of course, he had been heavily predisposed in that direction by his illustrious father. Charles Lindbergh was known to the general public mostly for his exploits as an aviator, but he had spent a great deal of the latter part of his life, until his death in 1974, working for the cause of conservation.

"I guess a lot of it rubbed off on me and my brothers," reflected Scott. Whereas Jon turned to oceanography and salmon farming and Land to ranching, Scott fortified his philosophical studies with a minor in animal psychology, then went on with Alika to Strasbourg for further work in the same vein, accompanied by a multiplying band of monkeys. Soon they found it impossible to turn away "gifts" from desperate owners who had been charmed by cuddly balls of fur in pet shops but in a few months tired of the racket and the stench.

By 1971, Scott's Strasbourg studies were finished and it was time to apply on a serious scale the theory they had been refining together in Alsace. The manor house which they chose for their primate center lies north of the Dordogne River, between the towns of Sarlat and Bergerac, and a more picturesque setting would be hard to find. The Lindberghs propped up the sagging

Mr. Chelminski is a multilingual journalist who works abroad, often appears in SMITHSONIAN. *He wrote on Chinese peasant painters, March 1976.*

Real trees, splashy colors and bright lights
re-create atmosphere of native treetop habitat.

beams, put the roof tiles in order, installed an oil burner and built commodious quarters for the monkeys in the barn. Today, the animals still have it better than the humans: their in-house cages are pleasantly lit, heated and humidified to optimum simian satisfaction. To save money, Scott and Alika heat only a bedroom and a sitting room, stuff rags under doors for ad hoc insulation against persistent winds and try to keep moving at a brisk pace.

Over the years, permissive monkey-rearing methods have produced an ingenious and somewhat incongruous layout. Inside, the animal quarters offer perches of real tree branches instead of steel or concrete, pink walls because that is to monkey taste (really), bright lights supplemented by ultraviolet for protection against human infections, rivulets of permanently running water, toasty radiators and even hammocks for a nice snooze. Outside, the Lindberghs' efforts have produced a crazy-quilt pattern of exit chutes, barriers and blinds, rope escape routes and electric fences sternly interdicting passage from one open area to another. The animals are separated, Scott explained, not by species but by groups. Contrary to accepted wisdom, they had discovered that black and red howlers could cohabit perfectly well with the woollies, sakis, titis, cotton-top tamarins, the marmosets and even the lone

Exuberant howlers enjoy egress from cages
to trees via chutes, ladders, ropes and gangways.

squirrel monkey. The most troublesome problem was more Freudian: sex and authority. Monkey societies always form into groups, and each group is inevitably headed by a dominant male, who marks his territory and defends it ferociously against the least intrusion from his species.

"After territorial fights," Scott admitted, "I've had to treat some really serious wounds. Sometimes it takes both of us to separate two fighting males. All I can do is disinfect. No use putting stitches in because they'd tear them right out."

Scott himself has been bitten several times when he inadvertently "invaded" a territory of a male who only a few years earlier had been a baby cooing in his arms. Each bite was a reminder of his own equivocal status in the natural order of Verlhiac. When the monkeys are young, they clearly accept him as the dominant male, the overlord of the entire domain. As they grow older, though, and their society becomes more complex—groups, subgroups, peripheral animals—that changes. He becomes "a respected friend, but still an outsider" is the way Alika put it. Opening a cage door can show him the limits of friendship by bringing him face to face (or fang to fang) with an infuriated male. The electric fences delimiting the territories prevent similar encounters between dominant males of the same species.

Apart from the rambunctious woollies, all the animals can take off "into the nature" if such is their desire, but few have ever taken the option seriously. However, a few weeks are required to give them a sense of "home," without which they would feel no need to hang around. In one case, an émigré was gone for a week before the constable spotted him crossing a distant roadway, heading in a beeline for the Amazon. But most tend to stay within hearing range of their extraordinary vocalizations, and all but the stubborn rogue retreat inside once the sun goes down.

"Let's say they can take the cold," observed Alika, "but are very disconcerted by the wind, probably because of the dessicating effect on their fur and skin. What they love most of all is a fine mist of light rain. They can sit for hours in that."

With all their innovations, though, it is probably in the field of nourishment that the Lindberghs diverge most dramatically from traditional zoo-keeping practice. The basic premise—let the animals choose for themselves—holds true here as always, but it is further reinforced by a superabundance of food that would have zoo conservators hauled into constant budget hearings. The practice, which Scott describes as "saturation feeding," is not unknown elsewhere but it

Black howler male on roof of manse keeps eye on competitors. Cheeky intruders are swiftly expelled.

Female black howler threads her way along hemp bridge toward her habitual perch in nearby sycamore.

is not common. Alika takes a positive pleasure in describing their feeding system as *gaspillage,* meaning sheer waste. In their natural habitat, she reasons, the monkeys hop from branch to branch and viand to viand like *grands seigneurs,* taking only a nibble here and a bite there, tossing the rest away with great panache. So why should these gourmandizers be forced to do otherwise in captivity?

Alika has posted herself several times in the feeding areas and tested the succulence of the rejects. Without exception, she maintains, the monkeys have nibbled away only the perfectly mature spot; they throw away whatever is too green or too ripe. By offering as wide a choice as practical, the Lindberghs present their animals with real alternatives and then observe and analyze their preferences.

"We buy bananas, pineapple, pumpkin, beets, onions, apples, pears, some oranges and a lot of seasonal food," Scott explained, "plus plums and cherries from our garden. We also collect ten different species of leaves. In the winter we can find several kinds of grass around here and wild lettuce, dandelions and hazelnut flowers. Then, of course, there is beef and fish and raw chicken and eggs. The animals tend to be omnivorous in captivity, and some of them even carnivorous. The howlers, for instance, are vegetarians in the wild but need a lot of animal protein here. Only the titis remain mostly vegetarian in captivity. They will eat some eggs, though, and insects."

As the heating bills go down in summer, so does the tariff for food. Spending more time in the open and continually warmed by the sun, the animals require much less animal protein and forage extensively for leaves, grasses and buds, as much for reasons of health as taste. The Lindberghs discovered in 1974 how expert their animals were in identifying and using nature's pharmacopoeia, when the entire red howler population was stricken with massive constipation against which all man-made medicines proved useless. With two males already dead and the rest of the colony apparently about to join them, Scott and Alika looked to their basic premise again and set the five remaining animals free in the woods. They returned in fine fettle. To this day the Lindberghs don't know what sure-fire natural cure the howlers could have found in the Dordogne (one can't help speculating about truffles), especially since their allopathic instincts were attuned to the South American jungles—but find it they did, and it saved their lives.

This episode gave the Lindberghs proof that their ideas were sound, that their animals had not become rigid automatons as they would have in the captive environs prescribed by zoological orthodoxy. The mixing of several different species within the same enclave was a chance innovation because they had to take in so many gift or sick animals.

"In captivity, the stimulation of natural events is excluded," explained Scott. "We try to keep their behavior potential open so if necessary they could repopulate their original habitat."

Although Scott tends toward scientific reserve and understatement, the word "zoo" sets Alika's eyes asmolder and she erupts into verbal pyrotechnics. Most zoos, she insists, are insane asylums or stinking dungeons or penal colonies or mini-Dachaus. It is only the very best of the traditional sort that she will describe with the faint praise of "hospital." Ferociously pagan, she delights in heaping obloquy upon the entire Judeo-Christian ethic and greets the ancient notion that Man is the center of the universe with con-

Each day's fare includes green and yellow vegetables, fruits and meats, much of it extravagantly wasted.

Doleful expression of endangered cotton-top tamarin is strictly for the camera. He's never had it so good.

tempt. She never graces a pet merchant, importer or hunter with any better appellation than "filth," "muck" or "garbage." The rest of her vivid terminology is unprintable.

If she and Scott are not yet able to converse with their pets, it is because Monkese, like Chinese, places great emphasis on subtleties of intonation. But Alika does offer some rough translations. A delicate sniffing, more or less rapid according to the intensity of feeling, is a sure sign of affection, with a hug to follow. A long, trembling aspiration of breath, accompanied by vigorous clacking of the teeth, is an attempt to control a powerful emotion, whether it be passion or anger or fear. A brief cry followed by a long, sharp trilling is a call for assembly of the group. A foxlike yelping is an expression of surprise, amazement or, sometimes, worry. Repeated and prolonged, it indicates anguish. To the human ear, their cry of rage is spectacular and unmistakable.

As quaint or cute as all this may appear, the scientific achievements of the Verlhiac Primate Center are already substantial. Scott is about to publish some precise and original observations on the howlers' use of horripilation—that is, bristling of body hair, previously thought to be absent in this species.

"Most observers are handicapped," he noted laconically, "by the fact that they have to watch the animals at a distance of 20 or 30 yards, and vertically." He and Alika have compiled massive notes on such monkey business as grooming and territorial marking with urine. But the robust health of their animals is in itself an accomplishment. The Lindberghs are especially proud of a young howler named Tonnerre (Thunder), who was conceived, born and raised to good health in a captive environment—a rare occurrence indeed.

"We respect their likes and dislikes," said Alika. "It's so obvious, but others just didn't think of it. Most zoos put a good-looking male in with a good-looking female and call that choice. We let *them* choose, and you know what? They love each other!"

Is this mere sentimental anthropocentrism? Perhaps. The Lindberghs' work is a profession but also a special calling, on behalf of which they have given up ordinary comforts and tied themselves for the foreseeable future to an obscure Périgordian hamlet. In pursuit of their vision the Lindberghs have "ruined" themselves and are now casting about for financial aid, made all the more uncertain because he is American, she is Belgian and their institute is in France. Anyone who might consider granting funds can probably find something to question about an international setup like that.

Above the fireplace in the drafty sitting room of the Verlhiac manor is a large, dreamlike allegorical painting by Alika depicting the legend of Saint Hubert. Hubert, in the foreground, bears a remarkable resemblance to Scott; behind him, in the very center of the canvas, the fabled stag stands alert and handsome. But instead of the miraculous crucifix appearing there, the antlers grow upward and outward into a tree, silhouetted against the distant background of a snow-covered mountain. The painting is naive and yet powerful: man, animal, vegetable and mineral are one in the terrestrial Paradise. Alika put the same message succinctly toward the end of her book:

"Animal is simplicity of being. The animal obeys Nature, and Nature is always right." That may be tantamount to dogma, but it is dogma certainly worth considering.

Scott, in courtyard cage, slips cherries to one of his favorites, an opportunist who grabs what he can.

This red howler, *Alovatta seniculus,* stares fiercely and will attack anybody who gets too familiar.

CONSERVING ENERGY:

Check your home against this home.

Try this: close your refrigerator door on a new dollar bill. Does it hold the bill tightly? If not, the refrigerator probably needs a new gasket.

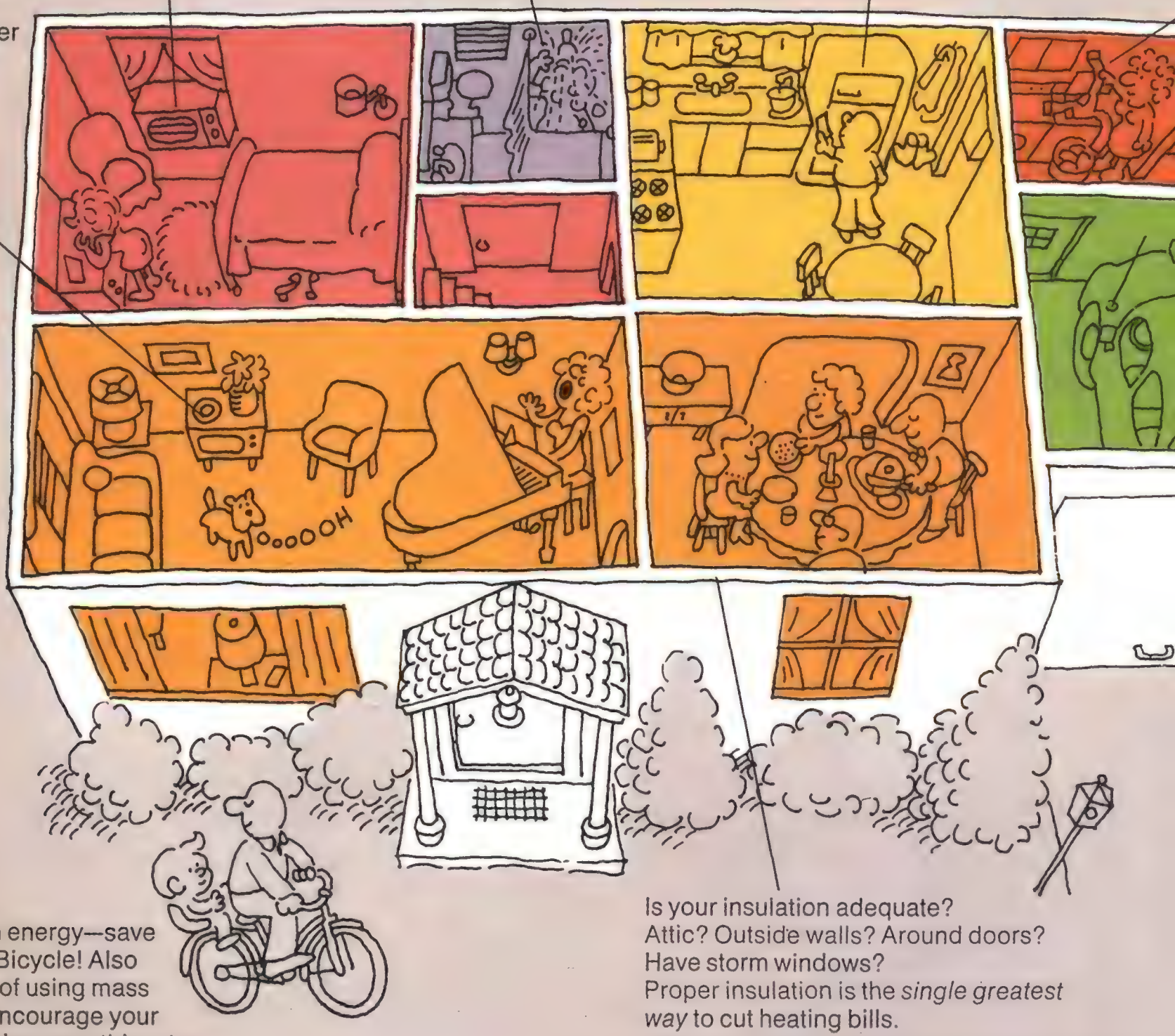
Also check the Energy Efficiency Rating when buying any appliance, including air conditioners.

Another energy-saver is to thaw meats before cooking.

Is that air conditioner really needed every time you use it?

Surprise! Taking showers instead of baths uses only about ½ as much hot water.

No one's watching . . . better turn off the TV. And how about switching to lower wattage light bulbs wherever you can?



Use your own energy—save the nation's. Bicycle! Also make a habit of using mass transit. And encourage your friends to do the same thing, too.

Is your insulation adequate? Attic? Outside walls? Around doors? Have storm windows? Proper insulation is the *single greatest way* to cut heating bills. (Check a contractor for local requirements.)

Energy for a st

Be sure to wash and dry only full loads of clothes. Also, are you washing with cold water whenever you can?

Are power tools needed, even for that small job? Muscle power might do it as well.

Car pool and combine trips. And when you drive stay under 55 mph—you'll use 11% less gasoline than driving at 65 mph.

Regular tune-ups and proper tire pressure save fuel, too.

It's as important today as it was during the shortage of '73-'74. Here's why, and what you can do.

During the winter of 1973/1974, Americans realized that it was critical to "save a watt" and "not be fuelish." Energy conservation was the watchword because some of the foreign oil we were using was cut off, and domestic supplies of gas and oil had not been able to meet all of our needs for some time.

Today energy conservation is practiced by many Americans. But greater efforts, by more people, are needed because conserving energy is absolutely vital.

Conservation: another energy source.

Gas and oil are finite, nonreplaceable resources. That's why Exxon is working on developing other sources of energy, as well as on ways of finding more gas and oil. But development takes time: 3 to 7 years to establish a coal mine; and it's going to take time before enough solar systems can be put into use to make a substantial contribution to our energy needs.

No doubt you're wondering how you and others can save energy, and if your individual efforts can save enough to really do any good. Absolutely! And one of the best places each of us can save energy is at home. When you consider the impact of 57 million American family dwelling units, the savings add up fast. In fact, the National Petroleum Council estimates that 14% of the energy now used in America's dwelling units could be saved . . . the equivalent of 11 billion gallons of petroleum products per year. So you see, your share is much more than just a drop in the barrel.

Saving energy also saves money.

The wise use of energy is also wise money-management, for it can save on your fuel and electric bills. Some examples: HEAT. Each degree above 68° F on your thermostat can add 3% to the amount of energy needed, and a proportionate amount to your heating bill. LIGHT. One 100-watt bulb burning for 10 hours uses the equivalent of 1 pound of coal . . . you pay for it on your electric bill. WATER. If a faucet leaks one drop of water per second, it can waste 700 gallons a year. If it's hot water, that's both energy and money down the drain.

There are countless ways to save energy. Our tip is to find the ways that are most practicable for you. You'll find familiar suggestions—and perhaps some surprises—right on the "home" shown at the left.

rong America

David Smith loved the countryside and loved to see his work in it, as here at his home at Bolton Landing, New York, an idea employed later at Storm King Art Center, New York.

By John Russell

David Smith's art is best revealed in natural settings

Although articulated through industrial means, sculpture of the master is as at home in open fields as flocks of sheep

The Storm King Art Center in Mountainville, New York, was founded only 17 years ago, but it is already widely known to people all over the world who think that modern sculpture is best seen in the open air. It ranks, that is to say, with the sculpture park at the Kroller-Müller Museum near Otterloo, the Netherlands, and the Billy Rose Art Garden at the Israel Museum in Jerusalem (SMITHSONIAN, October 1973).

In terms of landscape it has nothing whatever in common with either of those two institutions, since the Kroller-Müller stands in a flat sandy park known for its long-haired sheep, while the Billy Rose Garden is built on shelving ground that is held sacred by Jews and Christians alike. The Storm King Art Center forms part of a property which extends over several hundred partly wooded acres, including a working farm of enviable dimensions. It is rolling country (the roll has lately been accentuated here and there by ingenious landscaping) complete with shaven lawns, roller-coaster panoramic views, dense woods and a whole network of precipitous pathways.

In the middle of this is a house completed in 1935 by Vermont Hatch, a prominent New York attorney. When Hatch died in 1958 his holdings were as great a

Color photographs by Yale Joel

The range of Smith's lively imagination and the comfortable fit of his work in open space is

temptation as ever faced the developers in this part of the Hudson Highlands. It so happens, however, that a large number of people in Mountainville are employed by a hardware factory which was headed at that time by the late Ralph E. Ogden. He decided to buy the estate and to establish it as a center primarily for the open-air display of sculpture, but with the former Hatch mansion as a place in which smaller or more fragile works could be shown.

At the time when Ogden made this decision, the museum boom of the 1960s was still around the corner. No one knew what would come of his project. Many members of his intended public had never seen big modern sculpture in open country.

So Mr. Ogden had a great deal to play for—and, in the opinion of some, a great deal to lose. But he began at a great moment in American art, he began in a part of the country where there was nothing much else to see in the way of art, and he had a streak of poetic imagination which told him exactly what would look well where.

All this took time. Meanwhile, sculpture was moving along, and another fundamental decision had to be made: what was to be the basis of the collection? As the decision which eventually was taken now seems to be transparently the right one, we can easily minimize the size of the problem as it then presented itself. Today David Smith is acknowledged as a great sculptor. No museum could own too much of his work. But in 1966? That was another matter. Smith had been killed in May 1965 when the truck that he was driving ran off the road and overturned. Just how much he had left, and just how good it was, were facts known to relatively few people.

Nor were the trustees of the Smith estate too keen on selling a large number of Smiths to an institution still largely untried. The negotiations promised therefore to be difficult. Smith in his lifetime had by no means been spoiled by museums ("The artist has a natural distrust of the museum," he said, "since their policies and positions are opposite"), but he did very much prefer to see his sculptures in the open air. There was plenty of open air at the Storm King Art Center, and the march of the seasons in that part of the country has much in common with the march of the seasons at Bolton Landing, New York, where Smith had had his studio. In March 1967 it was announced that the Storm King Art Center had bought 13 sculptures from the Smith estate, thereby establishing the nation's largest museum holding of Smith.

The sculptures in question covered the period 1954-64. Seen today, with nearly a decade of hindsight to help us, we can debate forever as to the balance of the ensemble, as to whether this piece or that piece is "the best," and as to whether or not at least one earlier work should have been included (the trustees at that time did not wish to release certain major works except to major museums). But with an output as many-sided as David Smith's, and in a period when the ambitions of sculptors swing this way and that way

For a quarter of a century the art critic for the Sunday Times of London *and now writing for the* New York Times, *John Russell is the author of books on modern painters and sculptors.*

explicit here. At left is his stainless steel 1965 *Cubi XXVII*. At right, *Study in Arcs*, 1959.

year by year, there can be no ideal choice. Even if there were, not everyone would assent to it; for, as Smith said, "A work of art is always completed by the viewer and is never seen the same by any two persons."

The life of David Smith conforms for much of its length to a great many people's favorite daydreams. He was the all-American boy who took on the effete Europeans and beat them. He was the young man from Decatur, Indiana, who came to the big city, took all that it had to give and went back to the country. He was the true artist: the man who "lived for his work," never made art with an eye to quick money and kept his sculptures in an open field the way an Old Testament shepherd kept his sheep.

Born in 1906, David Smith knew by the time he was 19 that he wanted to be an artist. But art at that time was something that was made with costly materials, according to techniques that had been handed down through the centuries and took forever to learn. Smith went to work in a Studebaker factory to earn his living, and learned to use a lathe, a soldering jig and a spot welder, never dreaming that these skills could be the basis of art. Factory work was something he did to make money—"more than I ever made in my life," he said around 1950—whereas art was something separate: something to be learned from experienced artists in art school. In the fall of 1926 David Smith got to New York, where John Sloan and, above all, Jan Matulka helped him to orient himself as a painter. In December 1927 he married Dorothy Dehner, herself a painter. Smith was a big, rangy, adaptable sort of man, and when he got anxious about money (as he was to the end of his life), he would go to sea, drive a taxi, make window displays, or even act as art editor for *Tennis Magazine*.

Freedom for a ponderous art

But he never stopped painting and drawing, and by 1932 he felt he was making good progress. He was a friend of John Graham, the idiosyncratic Russian-born painter who helped a great many artists to learn what was going on in Europe and how best they could profit by it. The best source of information at that time was a magazine, *Cahiers d'Art*, which was published in Paris and was absolutely up to the minute with whatever was newest in European art. In 1932 the magazine illustrated some of the iron sculptures which Picasso (prompted by Julio González) had made recently. It was clear from these works that a completely new kind of sculpture had become possible. Whereas sculpture had previously been an art of volume and mass, it could now be a matter of drawing in space, of combining the most unlikely ready-made elements and getting them to work together, and of introducing wit, free-running fantasy and speed of thought into what had been traditionally and literally the most ponderous of the arts.

David Smith saw all this, and he also saw that the skills required for this new kind of sculpture were precisely the ones that he had at his disposal. "Since I had worked in factories and made parts of automobiles and had worked on telephone lines, I saw a chance to make sculpture in a tradition I was already rooted in," he wrote later. In New York in the fall of 1933 he bought the welding outfit that was to serve him for many years, he bought an oxyacetylene welding torch, and he went to work in the back room of his apartment at 124 State Street. Most of his first attempts caught fire and had to be put out by his wife with a sprinkling can. His landlord panicked. What Smith needed was a genuine industrial workshop, and before long he found one in Brooklyn: Blackburn and Buckhorn, Terminal Iron Works, 1 Atlantic Avenue. Blackburn was agreeable. Buckhorn was agreeable. Smith moved in.

It was the ideal situation. Smith in the Terminal Iron Works was not an artist among other artists. He was a man among other men. He never had to listen to art talk. Critics and connoisseurs had no idea of what he was up to. The other men in the workshop saw that he knew what he was doing, and they never tried to rib him or bug him. And he himself was very

Smith could fuse power and grace into harmony, as in *Becca,* 1964, an amalgam of welded steel units.

happy. As his friend, the British sculptor Anthony Caro, has said, "The studio is the place where you find out who you are."

"Who you are" dictates what you do in art. It helps to know what other artists are doing, and why, but beyond that you're on your own. You have only yourself to work with: your intuitions, your fears, your areas of maximum energy, your sense of what risks have to be taken, your stock of ideas that can be worked and reworked until suddenly they release all that you have to give. David Smith knew all this very well, and, unlike those artists of the second and third rank who try to put only their best self forward in their art, he put forward his whole self, quite fearlessly. He never tried to tidy his art. He had a loving, tender, steadfast, marveling disposition; but there were times when violence and frustration and sado-masochistic urges came over him. When that happened, they went straight into his art. If what he called "the battle of being" turned vicious and bloody, that too went into his art. Like every other human being of any interest, David Smith was a mass of contradictions, and in his art he found room for them.

Laying it on the line

So no one group of sculptures, however well chosen, can present the whole of David Smith. Anyone who knows the history of art can see at once that Smith was hypersensitive to the achievements of Cubism, Surrealism and Constructivism in Europe, and that what he achieved was a personal mix of these three. What was peculiar to himself was the American tendency to "lay it on the line"—literally, in his case, since a favorite instrument of his was the line drawn in space in ways not available to earlier sculptors. Like Picasso and Matisse, he felt that the artist's studio could contain the whole world and that what went on inside it could be as all-absorbing a subject for art as a set subject from mythology or the New Testament. Nothing in life—as he saw it, and as Matisse and Picasso saw it—is more intense than the moment at which one human being sits down to portray another. Smith's curiosity in this matter extended also to the metamorphoses which could come over his tools. Those tools could themselves be the subject matter of art, that is to say, and a pair of tongs or a wrench could be as expressive as the body of a young girl.

David Smith was also very sensitive to the idea, first mooted by Alberto Giacometti, that great art could be made from the notion of a whole house, opened out and accessible from every side, with its all human connotations intact and unhidden. Giacometti's *The Palace at 4 a.m.* in the Museum of Modern Art in New York is the great exemplar in this context. In 1945

two of Smith's sculptures—*The Reliquary House* and *Home of the Welder*—developed this idea with a particular complexity. It is as if he were making sculptures the way other men went to the confessional, or to the analyst's couch ("Reliquary chest for a guilty man" was one of his private names for the *Reliquary House).* Whatever was wrong in his own private life was compounded with all that was most wrong in the outer world until these two quite small sculptures become in effect a coded dictionary of midcentury woes. ("The warpage is in me," he wrote in 1952 or thereabouts. "I convey it to the person I live with.")

Sculpture as a rough art

In 1945 Smith lived alone in Bolton Landing for five months in a state of what Dorothy Dehner later called "the most awful inner turmoil and conflict." ("Where did I miss in growing?" he wrote on another occasion. "Or is everybody else that way and lying to themselves with illusions?") Whence, no doubt, the exceptional poignancy of sculptures such as *Reliquary House* and *Home of the Welder.* Smith had in his nature a destructive element which was the obverse of the trait that he had in abundance: drive. Drive helped him to make major art, but it also made him scratch away at hurts, real or imagined, which a lesser man would simply have forgotten. Drive led him to go headlong into problems and come out on the far side. "I know now," he once wrote, "that sculpture is made from rough externals by rough characters or men who have passed through all polish and are back to the rough again."

In his voluminous writings, of which a most valuable first selection was published in 1968 in *David Smith by David Smith,* edited by Cleve Gray (Holt, Rinehart and Winston), Smith talked a lot about roughness and coarseness and unculture. "Creative art has a better chance of developing from coarseness and courage than from culture. . . . I would much rather have a man who has no ideals in art, but who has a tremendous drive about it with the fire to make it. . . . The drawing that comes from the serious hand can be unwieldy, uneducated, unstyled and still be great simply by the superextension of whatever conviction the artist's hand projects, and being so strong that it eclipses the . . . qualities critically expected."

Reading this passage (and many others like it), we might imagine to ourselves a brutish kind of art, one from which refinement was outlawed. Sculpture of that kind has been made since 1945, but it was never made by David Smith. The sculptures at the Storm King Art Center would suggest on the contrary an art that is fine-boned, exact and delicate in its allusiveness, and full of lyrical intentions which are com-

Smith scoured surface of *XI Books III Apples,* 1959, for light's effect. It heralded major Cubi series.

The blunt exterior of David Smith is evident in this study, but unseen is his inner delicacy.

pletely realized. David Smith claimed not to want to have in his art the kind of femininity which he greatly enjoyed in life, but there is no denying that *The Iron Woman* at the Storm King Art Center has just the rounded slenderness which makes us all prize the sight of a pretty girl in the open air. (Later, when Smith through his second marriage had two young daughters, he loved to evoke their headlong chase across the fields. *Becca* at the Storm King Art Center [p. 72] is one of the best of these evocative portraits-in-movement.)

It turns out, as we go through the Storm King pieces one by one, that three quite separate endeavors were fused in the work of David Smith. The first of these is the attempt to summarize and move on from the state of sculpture as it had existed in Europe before 1939. The second is broader and more social in its general intent. Smith believed that older art was "history explaining past behavior, but not necessarily offering solutions to my problems." He believed that "art is yet to be born and that freedom and equality are yet to be born," and that "the freedom of man's mind to celebrate his own feeling by a work of art parallels his social revolt from bondage." As always, Smith's philosophizing was the reflection of a sophisticated mind and intense personal experience.

Along with these two endeavors there went a third, to which Smith did not refer in his writings. He wanted an art which would be adaptable to his every experience. If he took the train along the Hudson River week after week, he wanted a sculpture to come out of it. If he had a great meal at Locke-Ober in Boston, he wanted a sculpture to come out of it. If he had to write to his mother and answer one of the questions that every mother asks of every son, he wanted a sculpture to come out of that, too. If he read Helmholtz's treatise on color, he couldn't wait until he had set about what he called a *Helmholtzian Landscape,* a brilliantly colored scene which happened to be both painting and sculpture in one. When he felt in 1953 that the Korean War had gone on too long altogether, that conviction likewise prompted a sculpture: *Parallel 42,* which hints at the look of a dismembered corpse as it hangs in rags from a gibbet.

Something of this gets through even to people who know nothing of the history of modern art. They sense that somewhere inside the unbounded variety of David Smith's output as sculptor, painter and spirit—tumultuous, not easy to handle, divided within himself, but ultimately and absolutely on the right side in all the things that matter. They sense that when face to face with those "things that matter," David Smith didn't lie, didn't equivocate, didn't think of how to make a fortune for himself and went in fear of nobody. We leave the Storm King Art Center feeling that if David Smith were running the world it would be a very much better place.

Smith used industrial methods and materials to design form in space. This is *The Letter,* 1950.

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By Colin M. Turnbull

'Bush Negroes' carry on tradition of rebel ancestors

American scientists, investigating African culture in South America, find cause to reexamine their own feelings about the past

An 18th-century drawing portrays a "rebel Negro" in what was then Dutch Guiana, now Surinam.

The priest dipped leafy branches into a gourd filled with consecrated water and sprinkled it over the two men, preparing them for purification in the river. He led the men out into the shallows and made them kneel, then immerse themselves completely. The whole scene, which I was watching on film at Harvard University, was similar to rites I have witnessed many times in Africa. Everything about it was African: the people, the ritual paraphernalia, the essential purification that accompanies the long cleansing ritual.

Only when one of the two men seemed uncertain about the total immersion and had to be coaxed, then pushed, by the priest was I reminded that this was South America, not Africa, and that even more important the two men being purified were not Africans, but black American scientists. The hesitant one had reason to be wary: the river was full of piranha.

The two scientists made a personal discovery in Surinam (formerly Dutch Guiana) that they felt was important to their fellow black Americans. They made a film that, while not pretending to be an anthropological documentary, records a living experience that deserves recognition. As a social anthropologist, I was fascinated by their story, even though they were not particularly interested in anthropology itself, least of all the kind that specializes in abstract models of kinship or political systems.

The existence of African peoples living in the forests of South America, especially Surinam, speaking a mixture of European and African languages and maintaining African traditions, has long been known, at least in anthropological circles. Yet black American scholars, questing for an African identity, have made little significant use of this situation. Professor Allen Counter, who with David Evans has now organized four expeditions from Harvard to South America, is neither an anthropologist nor a historian. Counter is a neurobiologist, Evans an electrical engineer. Their first objective was biological research, particularly into the efficacy of traditional herbal medicines and treatments. This interest was then expanded into research in two other major fields, audiology and mental health, with the last two expeditions including highly qualified specialists such as Levi Watkins, a cardiac surgeon, and Earline Houston, a psychiatrist.

All were black Americans, the first that many of the Surinam Africans had ever met. It must have come as something rather more than a shock to be

A young Saramaccan, armed with a toy wooden gun,
acts out historical drama of his rebel ancestors.

Another drawing depicts a woman slave tied up for whipping, a cruelty from which many escaped.

asked, through interpreters, as these sophisticated scientists were on one occasion, if they were still slaves. The question was a function of their blackness; their response might be said to have been a function of their *not* being anthropologists, for it was a deeply personal and sensitively emotional response, qualities anthropologists are too often trained to suppress.

The forebears of many of these South American Africans won their independence from the Dutch colonial powers by formal treaties before the North American Colonists won theirs from England. Today those treaties are under review, for the government of contemporary Surinam has to accept responsibility for all those within its borders and maintains that the treaties grant to the Bush Negroes not ownership of the land but the right to use it.

The Surinam descendants of Africa see no need to abandon a traditional way of life that has from its inception, 300 years ago, given them both freedom and dignity. They have already seen what happens to those, an ever-increasing number, who leave the inland territories to take work in mission or government centers, not to mention the coastal towns and cities. They see a loss of both freedom and dignity. Yet they recognize the winds of change and feel that the attempts of the Dutch to introduce improved medical and educational facilities were beneficial in the long run, just as improved communications (including airstrips, roads, river ferries) had begun to bring about the inevitable transition in a relatively nondisruptive manner. Tribal leaders, however, are going to have to face opposition from ultraconservatives who want nothing to do with the brave new world, and radicals who feel the pace of change is not fast enough. A strong isolationist element dislikes (and in some cases prohibits) the presence of *baka* (outsiders), and if that applies especially to whites, it is more because of behavior than color. On their first two trips Counter and Evans deliberately chose not to include any whites.

The Bush Negroes' isolationist attitude is not difficult to understand. Their past history as escaped prisoners of war is still very much alive, and is even perpetuated in ritual drama. Certainly their present way of life, outwardly so traditionally African but in effect a rich blending of African, European and Indian elements, can be understood only if we understand their origins out of slavery. When the first slave ships reached the South American coast in the early 17th century, many jumped ship, banded together regardless of tribal origin, and fled into the forests without ever actually being sold into slavery in the New

Colin Turnbull, author of The Mountain People *(about the Ik:* SMITHSONIAN, *November 1972), is an anthropologist who has studied traditional societies in East, Central and West Africa.*

Contemporary tribal women sing an ancient spiritual about their forebears who defeated the Europeans.

World. More escaped from the plantations and joined the free Africans who steadily raided the plantations for supplies, guns, ammunition and women. The policy of slaveowners in South America was generally contrary to that in North America—people of the same tribal origin were kept together, rather than being dispersed with the notion that tribal differences and rivalry would prevent them from unifying in any mass uprising. The result was the continuity of a relatively homogeneous tribal tradition, in this case largely of Akan (and more specifically Ashanti) origin (SMITHSONIAN, January 1973).

The horrors of slavery are not forgotten lightly, and slaves fleeing into the forests must have brought accounts like those graphically reported by a British officer in the Dutch Army, John Gabriel Stedman, in the late 18th century. Himself part of a five-year expedition "against the revolted Negroes of Surinam," his record is an incredible testimony to the courage, skill and success of the Africans, but it is also a horrifying account of such brutalities as execution by impalement on a large metal hook, which is then suspended, dangling the victim until he dies, perhaps days later. Stedman meticulously drew sketches of a number of such horrors, sometimes perpetrated by the very people who employed him in the attempt to recapture the runaways and put down the "revolt."

Stedman recounts one particular execution that he witnessed in which an African was tied to a rack on the ground, his left hand chopped off, his bones smashed with an iron bar—and then left for dead. But as Stedman was leaving the scene, the victim regained consciousness and asked for a pipe to smoke, at which point he was kicked and spat on. He declared, Stedman tells us, that he knew he deserved death, but had not expected to die so many times.

This, then, is what the Africans in Surinam escaped from. Little wonder they cling to their freedom and

A Bush Negro holds a fish he impaled with an arrow. This technique has not changed in centuries.

independence. And little wonder that in their dances they ritualize the escape and keep it alive in their memory, a constant incentive to be prepared. This is the past they consciously remember, not Africa. As a result, their villages are still frequently placed at the head of rapids where they can command a formidable advantage over any force attacking by river, still the only feasible approach other than by air. Their internal political and kinship systems also seem to fill a need for fragmentation into remote, isolated and relatively autonomous villages on the one hand, and, on the other, the need to have a means of fusion into larger units, to meet a major attacking force. There is also ritual defensiveness: the entrances to the villages are often bridged by protective gates.

A village such as those visited by the Harvard team, nearly 200 miles into the interior, is relatively independent, having its own claims to water for fishing and land for farming and hunting. It may have formal links with neighboring groups of Indians for trading purposes—there seems to be little history of conflict with them, except for periods when Indians were enlisted by whites to help pursue rebel slaves. If the present-day culture of the South American Africans were merely a hodgepodge of divers tribal cultures, or even if it were a single culture transplanted intact, it would be a far less fascinating story. What has happened demonstrates the extraordinary vitality and adaptability of traditional African culture. The African tradition is nothing if not malleable, ready to enrich itself by contact with other cultures, and it is this process we can see at work today among the South American Africans.

The women of the village are not subservient to the men, the research team found. They are physically strong and occupy prestigious positions. Both wealth and status are inherited in the female line.

When first formed, these Surinamese villages consisted of men and women who were not of the same tribe in many cases, let alone of the same segment of any one tribe. They were thrown together haphazardly as they fled into the interior, forming units for mutual protection that were based on expediency rather than kinship. While the matrilineal principle would have been familiar to some if not all of them, there was no commonly accepted way of establishing which lineage was senior. It was adopted, but to avoid suspicion and jealousy the power conveyed to the "ruling" lineage was restricted or rotated.

The villages seem to house between 100 and 200 people, and apart from a few trade items they exploit the natural environment for all their needs. The villagers live largely by a combination of fishing, hunting and farming. Men do most of the heavy work of cutting and clearing, the women plant and tend the fields. The staples are cassava (manioc), rice and bananas, while peanuts are an important food that adds protein to an otherwise starchy diet. The Harvard expedition discovered a likely correlation of cassava-eating with deafness, which may result from consumption of cyan-

The family above—the father carrying fish and mother their baby and food—could have been drawn today.

A Saramaccan woman carries her baby and a basket of food just as she would have in the 1700s.

ide residues (most of which are carefully extracted in large presses before cooking) when the root is eaten. Use of the press is one of the many things learned from the Indians with whom the Africans came in contact and, to some extent, displaced.

Indian influence can also be seen in their hunting and fishing techniques. The bow is certainly as Indian as it is African, likewise the canoe, and a number of the fishing techniques, especially some of the ingenious spring traps and lines, are Indian as well as African. A poison is used for fishing in small streams, just as in Africa, though the local poison was probably learned from the Indians.

If the Afro-Americans of Surinam are adept at maintaining their political and economic defenses, they are no less adept at maintaining their psychological and spiritual defenses. Supporting the whole social structure is a rich body of belief and a cosmological system by which the people see themselves and the world around them as a comprehensible whole. They regard themselves, each tribe separately, as "the people," distinct from others. That does not mean they are necessarily pervaded by mutual hostility—rather, that they recognize the *potential* for hostility. The gates by which all must enter the villages, the shrines within the villages, all serve as means by which "evil spirits" (which might well be interpreted as "hostile thoughts and intentions") are cast out. Even within a tightly knit village, the possibility of dissent is recognized. This is brought to the fore at the time of the greatest crisis that faces any of us, regardless of our culture: that of death.

The Counter-Evans team witnessed two funerals that involved nearly everyone in the community. The body is first placed in a small empty canoe, then transferred to an elaborate casket. Both the canoe and the casket holding the body are carried around the village, from house to house, on the heads of men. Each sways back and forth as the priest interrogates the village as to who or what caused the death. Swaying from side to side indicates a negative response, a downward dip is a positive response. There seems to be a therapeutic intent and result as each segment of the village, if not each villager, is questioned in turn and made to share in the guilt. Everyone is forced to wonder if he has not contributed in some careless way, however unwitting-

ly, to the death. Similar rituals exist in Africa.

When the most recent expedition arrived, Counter was suffering from acute tendinitis of the elbow and could not pull his 60-pound bow. The village doctor offered to treat him, and because the treatment involved no incisions or surgery, merely the application of blessed water and certain herbs, Counter acquiesced. All he felt was a "mild tingling," a slight warmth which was said "to strengthen the bone." The same treatment was used in setting fractures, the doctor said. That evening, Counter admits with a little embarrassment, he had no difficulty whatsoever in pulling his bow, and the trouble did not recur.

The researchers brought back an experience uniquely black and uniquely American, and if they step beyond their scientific specialty, it is not into history or anthropology or psychology, but into this black experience in which they are, after all, inadvertent specialists. It is a story that only they can tell. It was, as Allen Counter said, like going back a year for every mile traveled, into the past when their own ancestors had landed on the shores of North America but were less lucky. The written record focuses so completely on the degradation of slavery that it has not been easy for the black American to find a source of pride in his immediate past. He knows of the inner fight he wages daily, even now, but it is not as dramatic as the successful guerrilla warfare waged by the Africans in South America. Nor can he make the proud claim that his ancestors were never enslaved. The first thing the Harvard team of black scientists felt, when they came face to face with Afro-Americans in Surinam, was an immense pride in meeting blacks who could and did make that claim, and who had been proudly and formally independent for more than 200 years.

The next thing they felt, however, was a fleeting sense of guilt or even shame when they were bluntly asked if they were slaves or if their ancestors ever had been. Counter and Evans responded that their ancestors had come over in the same ships, that they also came from Africa. "Have you found the way home yet?" they were asked. "Then are you still fighting?" This must have been even more difficult to answer, each wondering whether or not his own personal fight would measure up to the proud standards of his interrogator. And finally the most hurtful question of all: "Well, have you won?"

We are not used to such frank and direct questions in our society, but no offense was intended or taken. It did, however, force this team of black Americans to examine more closely their own private battles for freedom and dignity, and that of the black Americans as a whole within the institution of slavery, from which they had no means of escape. Both Counter and Evans grew up in poverty and in the South, and had every reason for pride in personal achievement, but how could they explain their feeling that they had yet to achieve total freedom in their own country?

Their message to their fellow blacks is not to take the next plane to Surinam. They respect the privacy of the people among whom they have worked too much to want them to be inundated with ego-trippers and tourists. Rather, they seem to want to convey the belief that a pride in the past does not have to go all

Young gravediggers carry canoe on which corpse had lain. It should point to those implicated in death.

the way back to Africa, anymore than it does for the South American Africans. It certainly cannot be found in the dubious quest for a specific tribal heritage if that quest ignores the reality and the sufferings and inner battles of the very real and not-long-dead ancestors of the immediate past. They feel a sense of urgency in exploring that past, the need for research to be undertaken by young black scholars. Having confronted, in a sense, their own past in Surinam, they know for certain that black became a source of pride not just in the 1960s, nor when it was isolated in the remote African past, but when it first came in contact with white on the shores of the Americas. That has become, for them, the road home.

A doctor treats the inflamed elbow of scientist Allen Counter with an herbal medicine; it worked.

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By S. Dillon Ripley

Bird that is loath to fly but roams afar all the same

The rail is an avian adventurer that can turn up virtually anywhere on Earth, and then quickly evolve new adaptations

For a bird-watching teen-ager, one of the hardest birds to see in life is a rail. Sometimes just after dawn, when my schoolmates and I used to slip stealthily along the Bantam River in Connecticut in our canoe, we would be on the lookout for a sora, or a Virginia rail. We would peer until our eyes ached through the late July mists rising next to the grass-fringed mudbanks of the river. Swallows dipped over the water; swamp sparrows and yellow warblers scuttled through the buttonbush and past the cattails. A female wood duck, startled, would rise with a splash off the water, her mournful wild call echoing "co-eek, co-eek." We knew that would alert any rails to stay hidden.

But round another bend, on the quaking flats, sure enough, we saw the best of all possible sights: a mother Virginia rail, walking sedately over the mud with no sense of alarm, daintily probing from time to time with her long, thin bill, followed by three minute black fluff-balls on the tiniest sticks of legs, her newly hatched chicks. The mother was a lovely russet color on the breast, brown streaked with black on the back, with bright black-and-white barred flanks, and a white undertail patch which she flicked upwards as she strolled off, as if to say, "Follow the signal, kids."

When she saw us, the mother gave one of her alarm calls, a sharp "keck," and with both wings widely spread and her head low, scuttled into the sedge, followed like sprites by her little black shadows. When these elusive creatures wish to, they can slip into the grass, pushing between stems of close-knit bunch grass or through tussocks so quickly—leaving no trace—as to give the impression that it was a momentary vision with no substance, a wraith.

Yet the marshes can suddenly fill with sound, especially nowadays when tape recorders make it possible to capture a rail call, like the sharp insistent "kicker" calls of the territorial male Virginia rail, "kid-kid-kidic." In 1974 a survey of the rail population at the mouth of the same Bantam River, using a tape recording as a lure, showed that there was not one pair of Virginia rails, but some dozen pairs, apparently in residence, where none had been seen in recent years.

Rail is a general term for members of the family Rallidae, marsh birds structurally related to cranes, but small to medium in size. They are ground dwellers, often aquatic, and very well adapted for life in dense vegetation.

My observations of rails stretch back now from school days to expeditions in New Guinea when I was on a college faculty years ago. Rails are one of the most widely dispersed of all avian families, being found from the high latitudes of America and Asia, from tunnels in the snow around hot springs in Iceland, south almost to Cape Horn and islands south of New Zealand. Rails live everywhere on the continents except deserts, of course; they live near marshes or in tropical savanna grasslands near small swales and damp watercourses. The most aquatic species, the coots and moorhens (known as gallinules in the United States), live near ponds or estuaries and are free-swimming, nesting sometimes on mountain lakes as high up as 21,000 feet above sea level.

I began to be intrigued by the rail family during my first South Pacific voyage on a schooner in 1937-38. I was employed by the Academy of Natural Sciences in Philadelphia as a zoologist and collector of specimens. Whenever we dropped anchor at small islands, I was always on the lookout for rails. Some species had not been seen since the days of Captain Cook's voyage of discovery in the 18th century. Were they still extant?

I searched all over Tahiti and neighboring islands for the Tahiti rail. It was flightless and, indeed, it had become extinct, as far as we know, because of the introduction of rats to the islands. But I did find a rarely seen rail on New Guinea, where I camped in the mountains, the first naturalist to visit this particular range. It was the white-striped chestnut rail, a creature about the same size as my friend the Virginia rail, but here an inhabitant of dense tropical mountain forest at 5,000 feet. I was startled by my Papuan guides when

Adapted from Secretary Ripley's Rails of the World, *David R. Godine, publisher, Boston. Ornithography of painter Fenwick Lansdowne combines art, science in a meticulous realism.*

one evening they brought in a pair of these beautiful mahogany-colored birds with black-and-white striped backs. I discovered that they made themselves a roost for the night, a little covered nest of leaves and twigs on the forest floor, and huddled there in a snug little bundle. No naturalist had ever seen this before.

Other rails perch at night, just like some pheasants or turkeys. I have found two other species' roosts in New Guinea, one a powerfully built flightless rail, a bird as big as a coot, with minute wings and immensely strong legs for its size, which can kick like a miniature cassowary or a fighting cock. These birds are so strong that they can defend themselves against rats or even fight off small dogs, the Papuans told me. This species perches solitary, high up in mangroves or pandanus trees which it climbs with great agility. Another small gallinule, the rufous moorhen, I found perched in pairs, using the same bushes every night.

Although rail species vary in size from tiny quail-like birds four inches or so long to the coots and the giant mountain-dwelling takahe or notornis of New Zealand (a hen-sized gallinule thought to have long since become extinct; a hundred or so were rediscovered in a remote valley in the 1950s), all of them behave in a remarkably uniform way. All rails stride along rather deliberately and precisely, compared with shorebirds or sandpipers. Plovers and the smaller waders, almost always found on open ground, pause often to orient themselves, then tend to run rapidly in a patterned sequence. Rails, accustomed to cover, move more continuously without long pauses for visual orientation. If they pause, it is likely because they are feeding, preoccupied with materials on the substrate, turning leaves or digging with their bills. That is why rails seem relatively fearless if you come upon them in the open. I have watched a sora rail on winter grounds in Florida walking deliberately along a roadside pool, paying no attention to the traffic passing by. A shorebird would have long since taken alarm and flown off. In other words, if a rail *chooses* to come out into the open, it may behave as though it were still in cover. In South Carolina tidewater, on the salt marshes, where at change of tide clapper rails appear, you may see them quite openly crossing the mud-banks, sometimes probing with their bills like snipe.

John James Audubon hunted clapper rails around Charleston in the 1830s and writes of the skiff or canoe loads of birds killed in those days. Clapper rails can still be seen there by you and me, but they are much rarer now, like all creatures dependent on salt marsh and estuary. In developed countries today, such prime habitat of the rail family is rapidly being destroyed as marshes are filled in, streams diverted and water impounded or managed in various ways. One subspecies of clapper rail living near the mouth of the Colorado River is said to be in great danger owing to the cutting of the reed and cattail beds to encourage motorboating and water sports.

Clapper rails, along with their relative the king

Red-necked and chestnut-headed crakes; white-striped chestnut, New Guinea chestnut rail. Indonesian archipelago is home to these rails.

rail, are two of the largest members of the family, being foot-long, gray-brown birds with striped flanks, dark, rather sandy breasts (though sometimes more russet colored) and with long bills. In the northern states they migrate and sometimes crash into windows in towns, or turn up on someone's lawn by mistake. But this is *only* by mistake, for they are birds of the marsh and swamp, more often heard than seen, especially on spring nights when their harshly insistent calls mingle with the frog chorus. I have kept clapper rails in captivity, raising them from chicks found in the marsh. They are fond of animal food, crabs, snails, slugs and burrowing invertebrates in the tidal zone, and recent anatomical study gives some indication that these rails, unlike most other birds, have powers of smell. Their olfactory bulbs are very well developed; they contain bundles of nerve ends running back from the base of the bill and nostrils. There is every reason to suppose that the ability to smell would help a rail hunting its animal prey by probing in damp mud at first light or in the gloom of late evening.

Over the years it has been the question of migration which fascinates me about rails. Almost all species of birds in the United States migrate to some extent. As I grew up in Connecticut, part of my quest for birds as a boy was the intriguing spring bird migrations, particularly of warblers and other colorful species arriving in early May. The rails came to our part of the world then, too, soras and Virginias and occasionally a clapper, rarely a common gallinule, and a coot or two on the lake. But in my wanderings by schooner or through the Asian tropics I found rails far more provocative. This is the one bird family I can think of which has a different pattern from the normal migration, one which has led to evolution by dispersion. Rails, or their bony remains as extinct former residents, are found on the most remote oceanic islands. How could they have got there? Most rails in tropical or subtropical latitudes are not particularly migratory. Anyone watching rails over the years is always puzzled by the fact that they are loath to fly. If you flush them in a marsh they will fly a short distance rather feebly, legs dangling, and after a time simply flop down into the grass again. They are almost im-

Two colorful races of purple moorhen frequent (at top) eastern and southern Africa, Madagascar, and (bottom) Mediterranean Europe and Africa.

The brightly colored American purple gallinule at the top, with its confreres, the smaller azure gallinule and Allen's gallinule—all reluctant flyers.

possible to flush a second time. Yet there is nothing to prevent their flying. If a rail should decide to fly, it has the equipment; it can fly as steadily, once it has tucked its long legs up behind itself, as any plover or other long-distance migrant. And of course it happens. Immature American purple gallinules have turned up on Tristan da Cunha Island, about halfway between South America and South Africa, with disturbing frequency. But purple gallinules have no business being there. They do not migrate, except around the Caribbean and northern South America in an unstructured manner. So what are they doing in the middle of the South Atlantic?

The answer must lie in the fact that they do not really migrate, but rather "burst out" sometimes at random. Whereas most birds have a migratory pattern with defined pathways in space, following identification marks whether in the sky or on land or along the seacoasts, rails just take off and go; they can find themselves anywhere from Australia to Timbuktu. Thus the Eurasian rail, the corncrake, which has a relatively conservative regular migration into Africa, may turn up at sea, arriving exhausted on a ship in the Indian Ocean or even off New Zealand, an incredibly impractical state of affairs for ordinary birddom.

What survival value can there be to this behavior? That began to intrigue me, and so in 1960 I determined to start collecting all the information I could find on the family. Alfred Newton, the famous British zoologist who worked at Cambridge for nearly 50 years, once wrote that the family of the rails had been greatly neglected and deserved a monograph. By luck no one had ever attempted the task, and so I decided to accept Newton's implicit challenge. The book has been a long and satisfying voyage in itself, more than 15 years in the making.

As I studied the rail family, I found myself transported back into the world of explorers. Many rail species, found on remote islands or in little-known parts of the continents, speak to one of John Gould, John James Audubon and Alexander Wilson, or of the travels of Charles Darwin and Alfred Russell Wallace. There is a 19th-century flavor to rails. So many of them are recently extinct, or sadly threatened by the introduction of pests to islands and by development or destruction of forest habitats, that it is difficult not to feel nostalgic about the whole family, and I fear for its prospects. Their curious habits, their evolution by dispersion, have led them into all the world's nooks and crannies where they swiftly—in 10,000 years or so—evolved new forms and sometimes even became flightless, as on Laysan Island west of Hawaii, committed forever to staying on that mile-long speck of land. Isn't that risky, you say? It may be, but how much riskier to perish on a dispersal flight to nowhere.

In any case, the poor little Laysan rail is indeed gone. Taken to nearby Midway Island when rabbits were introduced on Laysan and nearly exterminated the vegetation, the Laysan rail flourished on Midway until the advent of World War II. At first it captivated American naval personnel by being utterly fearless and, agile in spite of being flightless, springing into people's laps or onto the mess table in search of crumbs of food. Unfortunately, the delightful creature perished sometime after 1942 when a Naval landing craft with a few rats drifted ashore on one of the islands. In all the intervening years only Alexander Wetmore (who became Secretary of the Smithsonian Institution in 1945) had had the wit to take a few of the Midway birds back to Laysan, where the rabbits had been exterminated. Unfortunately, the vegetation had not recovered sufficiently to support the birds and they perished. So the Laysan rail, like many another species, vanished in a twinkling, a victim of Man's insensitivity to his fellow voyagers on Earth.

Some of this sense of loss, a feeling for the past, and a fascination with the old days of voyaging, have crept into our project. We have tried to convey some notion of what the world was like when it was a larger place, and wonder and affection permeated the lives of those who were privileged to be observers of nature. The rails have been a quintessential part of that world and, we hope, will remain so.

Four crakes: striped, spotted, African, corn. The corncrake normally follows a regular itinerary from Europe and Siberia into Africa and back. Occasionally, for no clear reason, pattern breaks and bird ends up in Indian Ocean, New Zealand. Rails are notorious for weird dispersal habits.

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They don't exactly worship a banana god on tropical islands, but one authority found back in 1903 that babies "and all other domestic animals" thrive on his symbol.

By William Breisky

But yes, we had bananas—coming out of our ears

If there's a bumper crop in your garden, you may have to be resourceful in putting all those fruitful fruits to use

It was in the Philippines, apparently, during the Spanish-American War, that the expression "But yes, we have no bananas" elicited a snicker for the first time and thus set out on a journey that led it to Broadway in the 1920s, where it became a popular song.

But it was my wife who, when I entered the kitchen once too often with one too many bunches of my home-cultivated bananas, was the first to declare: "You grew them. *You* make the banana bread."

The 100-odd banana plants lining the eastern and southern boundaries of Eastleigh, the Bermuda home we rented, were, our landlord pointed out, included at no extra charge.

That was how the landlord called it. The way the vacating tenant explained it, we could engage a certain Mr. DeSilva at $12 per gardening call, recoup perhaps $5 by selling choice hands of bananas to the produce manager of the local Piggly Wiggly supermarket, then sit back to admire a well-tended banana patch, and still be able to feast on as many bananas as any reasonable family would care to consume.

The departing tenant's scheme didn't appeal to us. We preferred to do our own gardening. Also, as Americans, we suspected we would risk a confrontation with the Bermuda Ministry of Labour and Immigration if we started selling produce to the Piggly Wiggly. We opted to go it alone with *Musa cavendishii*, the Dwarf Cavendish species most commonly grown in Bermuda.

And so it was that, in the first blush of our new

Illustrations by Mike Ramus

adventure, seaweed collecting became the excuse for Sunday-afternoon family excursions to Long Bay or Mangrove Bay—two children to hold open large plastic bags, one child and one mother to fill them, and one father to lug the filled bags back to the station wagon, then distribute the contents in circles around the bananas. *Musa cavendishii,* we had been informed or misinformed by a neighbor, just *loves* seaweed. Well, it didn't hurt, didn't help. Seaweed collecting remains, nevertheless, a commendable exercise in domestic togetherness.

But the novelty of feeding a hundred or so banana plants, and being fed by them, soon wore off and our ingenuity was put to the test. Today we know more about the banana than it is sometimes wise to know, and it is time to share some of this knowledge. Here are a few tips that should be useful to the next tenant at Eastleigh—or to anyone else who might find himself in Bermuda and in a comparable fix (of *not* having no bananas and not knowing quite what to do with them all):

1. The most neighborly way to dispose of your surplus Bermuda bananas is to permit a few bunches to ripen on the far side of the limestone wall that fronts your property. It is unwritten law there that all fruit overhanging the colony's roads and lanes is common property. Children gorge themselves in the late winter on roadside loquats, and in the spring on Surinam cherries, and many a passing tourist has been offered a sample banana from our trees by an obliging tour-guide taxi driver.

2. At times of the year when you can anticipate a superabundance of bananas, cut some while they are still unpeelable green and deliver them to Mrs. Ruberry, who lives in the white house with the yellow shutters near the foot of Scott's Hill Road. Mrs. Ruberry will respond by dispatching her son Victor with some of Mr. Ruberry's fresh cabbages and carrots—and, more important, will demonstate how she was taught to prepare banana chips from green bananas in her native Cuba. (Pare away the skin. Deep-fry the firm slices until they turn light brown. Set out to dry on paper towels. Then flatten with a mallet, and sprinkle with garlic salt. Freeze some at this point if you have too many, and refry batches as required. Serve the banana chips hot, with a freshly caught broiled fish if possible, and be prepared to be told you didn't make nearly enough.)

3. When you find yourself with a surplus of bananas too ripe for Mrs. Ruberry, swap them with another neighbor. We've traded ours to Fred Ford for grapefruit, to Betty Hart for pints of Betty's Homemade Loquat Liqueur, to the Downings for Bermuda onions, to Muriel Roberts for African violets and to Keith Godfrey's granny for sacks of peaches, to Angela and Ronnie for fresh rockfish and yellowtail, to the Pattersons for access to their beach, to the Cavaleris for a ride in their cabin cruiser—and to a host of people for their prize banana recipes.

4. Feed some to your chickens. Our five venerable hens gratefully accepted any overripe or runty bananas we cared to throw their way—skin and all. The surplus bananas feed the hens and the chicken manure feeds the bananas. A tidy arrangement.

5. Leave a few for the lizards. Scores of lovely blue-tailed lizards live among our bananas. When overripe fruit splits open, attracting a host of insects, the lizards feast. The lizards are our friends. They snare scores of moths, flies, mosquitoes and other airborne members of the opposition.

6. A splendid thing to do with your bananas is to

Great for togetherness if not for the plants:
have the family gather seaweed, toss it at them.

Not guaranteed: an intelligence test in which apes piled up boxes to reach a suspended banana.

observe them closely and marvel at their unique lifestyle. Note that the main stalk is not a "trunk" at all but the overlapping basal portions of the individual leaf stalks—"pseudostem" is its most common name—and that the plant grows taller as each new, tightly furled leaf emerges from the top of the pseudostem while the older leaves droop and die. (Having no woody boughs, the banana is, in fact, not a tree but a giant herb.)

Observe that the true stem grows up through the pseudostem when the banana reaches maturity, displaying a plum-colored male bud and several similarly colored bracts, each eventually rolling back to reveal a hand of yellow female flowers which develop into single bananas, or "fingers." When the bananas have matured, the pseudostem dies—aged about 18 months—but the root system lives on. The apparent main root is not a root at all but a fleshy rhizome, from which young banana plants (suckers) emerge to take the place of the dying pseudostem. (The cultivated banana, parthenocarpic as a result of overhybridization, evidently manages well enough without producing seeds.)

7. If cinnamon-toast brown appeals to you as a color, collect some of the clear, sticky liquid that oozes from the stem when you are harvesting your bananas. I managed to stain half a dozen good shirts and a couple of pairs of Bermuda shorts with this sneaky syrup—which shows up brown when the stained fabric is washed—until it dawned on me that one man's stain is another man's dye. A more indelible cinnamon-toast-brown dyestuff than banana-stem syrup would be hard to imagine, and I now own a banana-harvesting shirt with a likeness of *Musa cavendishii* painted on the front with this formidable dye.

8. With the help of a benevolent sun, convert some of your bananas into "banana figs" by placing thin slices of ripened banana on a drying rack and setting under a hot sun until the fruit is dry and its sugar crystallized. Presto—in a day or so your perishable banana has become a near-imperishable confection, which in some tropical climes is set aside as a hedge against famine. (Note: To speed the process, set the drying rack on a foil-lined pan to reflect the sun's rays, and under a piece of screening to keep bugs at a distance. Refrigerate overnight, uncovered, if not dried out the first day.)

9. Freeze a few. The banana you've been advised not to put in the refrigerator is the ripe fruit dressed in the yellow jacket. Green bananas may be refrigerated to delay ripening—and ripe ones may be skinned and frozen, with a bit of orange juice sprinkled on them to discourage their turning too brown too soon.

10. Join forces with a church or school that schedules its fairs and fetes at times when the banana is most prolific. Our own bananas have proved uncooperative in this respect; they never seem to get themselves ready in great numbers for the St. James Church fairs or the Somerset Primary School PTA fruit-basket raffles.

11. Blend together banana, milk and honey or granulated sugar. Such ice cream-less banana milkshakes are what many a doctor orders for patients on a low-sodium diet—people with congestive heart disease or cirrhosis of the liver, for instance. I know of one rheumatic heart patient who shed 27 pounds while on a ten-bananas-worth-of-milkshakes-a-day regimen. The banana is lower in calories than cottage cheese, as high in carbohydrates and in satiety as a boiled potato. It is vitamin-rich (A, B and C), lacking in cholesterol and laudably high in potassium, which makes it particularly suitable for hypertense patients on diuretics.

12. Mill some banana flour from dried green bananas. In his *In Darkest Africa,* written almost two decades after his rendezvous with Livingstone, explorer Sir Henry Morton Stanley offered a ringing endorsement of this product's restorative qualities: "If only the virtues of banana flour were publicly known, it is not to be doubted but it would be largely consumed in Europe. For infants, persons of delicate digestion, dyspeptics and those suffering from temporary derangement of the stomach, the flour properly prepared would be of universal demand. During

William Breisky, who managed not to go bananas while among them, is now editing the newspaper Foster's Daily Democrat *in Dover, New Hampshire.*

A banana makes a serviceable blackboard or slide-show pointer, if pointed with due restraint.

my two attacks of gastritis, a light gruel of this, mixed with milk, was the only matter that could be digested." (Banana flour is, what's more, twice as nourishing as wheat flour.)

13. If your psychiatrist is on a round-the-world cruise, you might consider The Bunch as an alternative to The Couch. The banana, it was reported in the *New England Journal of Medicine* a few years ago, is a donor of the neurotransmitter serotonin, which has been called "the Hermes of tranquilizers." (Students in the 1960s claimed dried banana peel could be smoked in a pipe for its psychedelic effect. "Mellow Yellow" or "Tripping on Banana Peel" were the names of the game.)

14. If you are an armchair psychologist, you might employ Wolfgang Köhler's hanging-banana technique to assist you in getting a rough estimate of your child's IQ. By placing an out-of-reach banana in a cage containing an assortment of boxes, Gestalt psychologist Köhler became the first to demonstrate, convincingly or not, that apes are capable of considerable insight. Köhler's brainier apes would build a tower of boxes under the banana and grab the prize.

15. The banana skin's efficacy against burns is reported by naturopath Joseph M. Kadans, who declares in his *Encyclopedia of Fruits and Vegetables* that the "inner surface of banana skin may be applied directly to burns or boils for healing effect."

16. For further medical or scientific applications, call in the United Fruit Company for consultation. A company advertisement clipped from a medical magazine: "When the patient becomes an 'irregularity' problem—BANANAS belong in the daily diet."

17. Or on your next trip to Washington, seek out a few of the bananalysis experts whose works may be found on the shelves of the National Agricultural Library. Were it not for such a research mission, I might never have come upon "The Banana in Chinese Literature," published in 1940 in the *Harvard Journal of Asiatic Studies*, in which I learned that banana fibers first were woven into linen in China, perhaps as early as A.D. 100 . . .

18. . . . and that banana roots may be crushed into an essence which is sure-fire against jaundice, headache and measles. . .

19. . . . and the banana *oil* (tapped from the pseudostem with a bamboo tube) "can be used as a hair tonic, stops women's hair from falling and helps the hair grow long and dark."

20. The Hawaii Agriculture Experiment Station Research Report for February of 1973 offers a formula for a banana purée "suitable for use in bakery, dairy and other banana-flavored specialty food products"—but the recipe calls for two 55-gallon tanks, a mill, a heat exchanger and finisher, a supply of $NaHSO_4$ and some 30-pound storage tins. (The banana is not favored by the producers of America's commercially prepared flavors. Some professional flavorists seem to feel amyl acetate is superior to the real thing in yielding banana flavor.)

21. Similarly, I learned in a splendid 1959 tome called *Bananas*, by N.W. Simmonds, head of the Department of Potato Genetics at the John Innes Institute in Hertford, England, that Ugandans have been brewing banana beer (*mwenge*) for ages—but that, also, two dugout canoes are required for the process: one canoe for trampling the fruit, using grass as a crude filter; the second, a clean canoe where the juice can ferment for 12 hours after the addition of sorghum

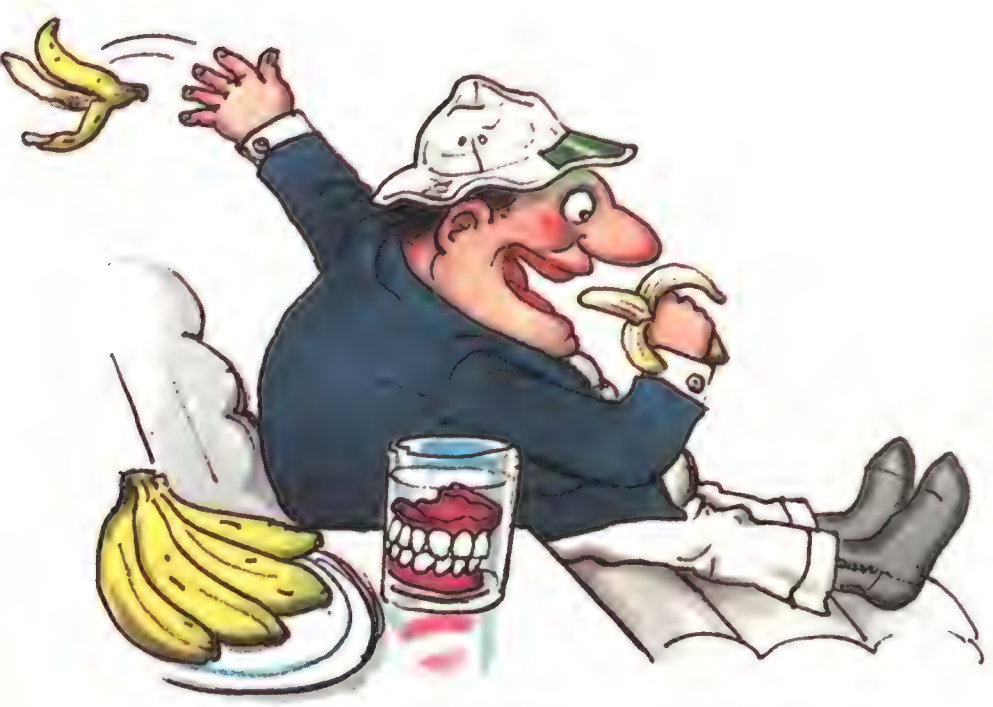
flour. "It is then filtered through grass once more and is drunk quickly."

22. Simmonds reveals that Samoans pound the ripe banana with citrus-leaf-scented coconut cream "to make a thick creamy dish called *poi*, which is eaten only by the chiefs" and by tourists being exposed to local flavor.

23. Also, Chinese pig keepers in Malaysia find cooked banana stems an excellent hedge against the kidney worm *Stephanurus dentatus* (in the pigs).

24. Sturdy rope, I've learned from several sources, has been made from banana stem fiber in various parts of the world.

25. Also (you will have discovered by now) bananas have been known to yield painful jokes—and not just the traditional one portraying the banana peel as "the best skin for making slippers." Woody Allen spliced together enough banana humor to create a full-length film entitled *Bananas*. A rube, as we all know, is best personified as a lost soul who "just stepped off the banana boat." Less well known, except in my recollection, is that great swing band of the 1930s, Willie Bananas and His Bunch—the Band With A-Peel. Tell your ten-year-old daughter about Willie's band and she will (I know from experience) counter with the question: "What is yellow and green and yellow and green and yellow and green?" (Answer: A banana that moonlights as a pickle.)



One masticatory advantage of the banana is that you can get it down without chewing.

26. While the banana may fail to eclipse the watermelon, the catfish or the chili pepper as a foodstuff that inspires extravagant but essentially true anecdotes, it may be counted on to contribute its share. A

Author's wife was perfectly reasonable within reason, but no devout admirer of the naked banana.

classic was recorded in 1903 by one Edward W. Perry of Naugatuck, Connecticut. "Bananas," Mr. Perry wrote, in an unfinished work entitled *Tropical America: Its Planters and Plantations*, "reach their best estate on the low, deep alluvium near the Caribbean coast . . . . Such low lands serve all the better if flooded two or three times in the year, for the banana will drink much water, and such floods bring silt from the hills, and thus keep the ground fertilized without cost to the owner.

"In 1897 the famed banana fields of the Río Escondido [on the "Mosquito Coast" of Nicaragua] were so deeply flooded that the steamship 'Saga' voyaged through the main streets of Rama, fully sixty miles from the mouth of the river, to pick off from their roofs the dwellers in that town. The bananas barely showed their tops above the yellow flood. Along the coast flew reports that the plantations were ruined; subscriptions were asked to help the planters—and three months later they were harvesting better crops than in years before. Their plantations had been so enriched that they bore most bountifully."

Mr. Perry referred to the self-tending, self-perpetuating banana as "nature's institution for the promotion of laziness," and declared that "In the land of bananas, cats, dogs and pigs, mules, horses and cattle, parrots, babies and all other domestic animals" thrive on them. "I myself," he testified, "have safely carried abandoned cardinals through from their infant days of a beggarly few pin feathers to those of full regimentals of brilliant scarlet and epaulets of jet; and they were as overflowing with joyful song and saucy happiness as they could have been had worms and bugs been the chief of their diet every day of their lives, instead of the bananas on which they had been largely

fed." And what's good for baby cardinals must be good for you, too.

27. With a handle and frame of oleander sticks and a lid of banana leaves you can fashion an umbrella which will perform better (because it lets the wind pass through) than the average silk umbrella in the average tropical storm.

28. Or you may (and surely will) photograph your bananas. Our houseguests invariably ask that we aim their cameras at them while they cavort among our bananas, and one of our favorite snapshots is of two Russian ship's officers—Aleksandr with a tattoo on his right bicep, and a grinning Lev with two golden front teeth—posing on either side of a bunch of golden Dwarf Cavendish.

29. One of the main things you will do with your bananas is worry about them. Is black-tip disease about to have its way? Will all the leaf blades be shredded, and some of the weaker plants be uprooted, by tropical storm Bertha? Have you and your machete done a good job of chopping off the unproductive water suckers in order that the productive sword suckers would have more elbow room? Should you let your fruit ripen another few days and risk sun scorch? Are your bananas getting enough nitrogen? Potash? Phosphate? Ammonium sulphate? And conversation?

30. Bananas are good shade producers, and their shade is made to order for contemplating the worries raised in No. 29. On Puerto Rico's coffee farms, the more statuesque Montecristo banana often is cultivated to provide shade for coffee plants. Our dwarf bananas have no such responsibilities, but they did provide a shady resting place for Doctor Pfeffer, our 14-year-old faithful schnauzer, who was laid to rest among the bananas where he had done some of his best sniffing.

31. Bananas flambé—an excellent thing to do with bananas. The same may be said for: ham banana rolls; banana shrimp curry; banana pumpkin pie; banana chutney; banana scallops; banana-coconut Betty; frozen banana daiquiris; and banana meat loaf.

One last pointer about the banana: the banana does, I have shown to my satisfaction, make a reasonably serviceable, if unobtrusive, blackboard pointer. But lecturers pressing bananas into service in this manner are advised not to press too hard.

One thing to do with your bananas: talk to them.

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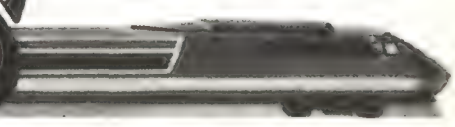


By Ritchie R. Ward

If you look hard cycles are all over

Recognizing them in any phenomenon, better yet their causes, can make our world less random and more predictable

The symbol for infinity is another way of saying what the ups and downs of

Cycles—and the rhythms within them—are as mysterious as they are common in Man and nature. We take for granted the rhythmic regularity of the heartbeat, the 24-hour pattern of our cycles of sleeping and waking, and the annual turning of a young man's fancy in the spring. But explaining these mysteries presents baffling problems.

Edward R. Dewey is president of the Foundation for the Study of Cycles in Pittsburgh, Pennsylvania, and has been an intimate student of cycles and cycle theory for nearly 40 years. He believes that the mystery of cycles in human affairs will eventually be solved and, when it is, that we should be able to anticipate floods, famines, epidemics, even depressions and wars. Armed with such foreknowledge, we should be able to avoid disaster, or at least defend ourselves against some of its worst consequences.

In his well-worn office, Dewey looked at me with bright eyes: "Wasn't sure either of us would make it," he grinned. "Worst traffic jam in the history of Pittsburgh, according to the news. Bus strike called suddenly at midnight, and this morning everyone had to fight his way to work by car. But then," and he smiled again, "strikes are cyclical; they come and they go."

"Like energy shortages, oil prices, highs and lows in Presidential popularity?"

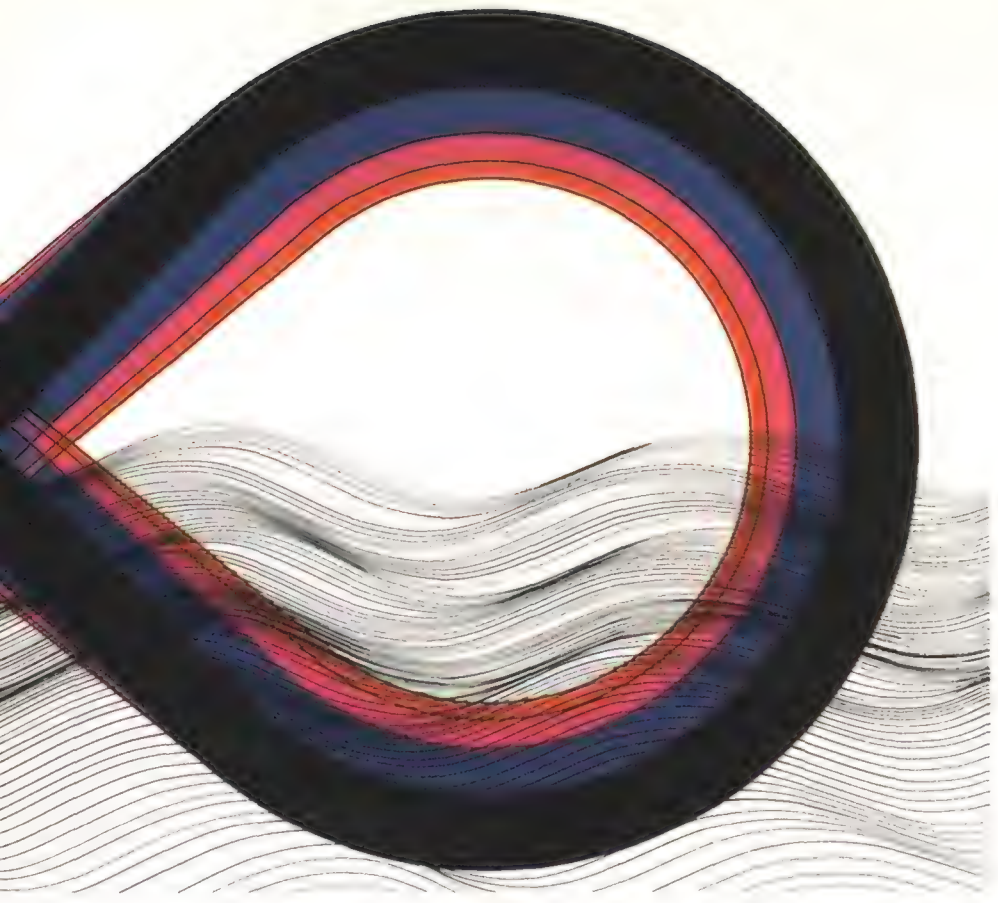
"Sure. Crests and troughs in all kinds of social and economic affairs, and in just about every natural science you care to name, including medicine."

"Really everywhere, then?"

"I wouldn't go that far," Dewey cautioned, "but I can say that we've been studying cycles for a long time and, so far, my associates and I have come up with more than 500 different phenomena in 36 different areas of knowledge that fluctuate in rhythmic cycles—that is, in oscillations that recur at reasonable, regular time intervals in such a way that they could not reasonably happen by pure chance."

I had read the book *Cycles: The Mysterious Forces that Trigger Events,* which Dewey wrote with Og Mandino. The word "cycle," he had pointed out, comes from the Greek word for "circle," and when we speak of cycles we imply only that something is coming around again to its place of beginning. It does not have the additional implication that there is a regular period of time before it returns to the place where it started. When these time periods are reasonably uniform, the cycle is more accurately called a "rhythm."

Oysters, for example, open their shells with the tides, and the grunion of the California coast wriggle up the sand to spawn just about 15 minutes after each of the two highest tides of the month. These are rhythmic. On the other hand, the swallows that return to Mission San Juan Capistrano every spring do not always make it right on St. Joseph's Day, and it would be stretching a point to call their migrations truly rhythmic; cyclic they surely are. Of the many different cycles that Dewey has studied, some are quite rhyth-



the graph lines say: that anything in a cycle will return to its starting point.

mic, and others are more or less irregular. Generally, therefore, he prefers the broader term "cycles."

Many of the cycles that Dewey found in his early work were from biology—and many of these were true rhythms. For example, he learned that peaks in the abundance of the Canadian lynx occur on an average of every 9.6 years; delving into the records of the Hudson's Bay Company all the way back to 1735, he found that from that year through 1969 there have been peaks in the number of lynx skins taken at average intervals of 9.6 years.

There are also peaks in the abundance of Atlantic salmon, and fishermen have regularly enjoyed their best catches on an average of every 9.6 years. Snowshoe rabbits in Canada, chinch bugs in Illinois, martens, fishers, owls and hawks also show peak populations on an average of every 9.6 years. So does the acreage of wheat harvested in the United States. So also does the incidence of heart disease in New England!

Should this then mean that nature beats regularly to a 9.6-year cycle? Perhaps it does, but not all animals march to the same drummer. Plagues of mice come every four years. The hordes of Norway lemmings that rush to the sea and destroy themselves do so every 3.86 years. Grasshoppers, in contrast, have three cycles: 9.2, 15 and 22.7 years.

When I saw Dewey, the stock market was in a long and depressing slide that seemed to have no end. I asked him if the market itself was cyclic, and perhaps therefore to some extent predictable.

"Of course. If you have a series of numbers that extend far enough back in time, and if they show reasonable cyclic regularity, then you have a basis for forecasting. That happens to be true of the stock market—within limits. But we need to be careful, because the problem is complicated by a great many variable factors. What we call "the market" is really a composite of about 1,900 different issues, each with its own individual characteristics. We would expect the market to display identifiable cycles of many different periods, and it does.

"When several shorter cycles happen to be in phase with each other, you can see longer waves that suggest the possibility of forecasting. But in due time the shorter cycles will drift out of phase, and then the pattern is harder to decipher. I have accurately predicted market ups and downs in my time, but I'm wary of it these days. Now, too, I'm much more interested in the egghead aspects of cycle study than in its immediate practical application."

I broke in. "Do you find some cycles that promise this egghead excitement along with the possibility of practical application?"

Dewey looked at me. "That might be true of cotton prices. Recently we updated our study of cotton prices which extend back to 1731. We find that these have oscillated in regular 17.75-year cycles for more than two centuries. This odd-length cycle holds much theoretical interest for us. For a cotton broker who knew about it, and lived that long, I'm sure it would be highly profitable."

The theoretical interest that Dewey and his coworkers have is based on the hope—or better say faith—that at some future time they can arrive at a satisfactory explanation of the whole cycle mystery: what causes cycles, whether some can be regulated to Man's advantage, and whether Man can make a better adjustment to others.

Unknown forces at work

"Actually," Dewey told me, "I feel that these studies are at the very heart of the universe, dealing with structure, with pattern, that is perhaps universal. We are dealing with something that is of tremendous importance in understanding the universe—for understanding ourselves, and for making forecasts in many areas of biological, economic, and social activity."

"How really solid are your clues?"

"Frankly, we have large areas that are purely speculative. But we *can* say that we have overwhelming evidence that some kinds of environmental forces must exist that alternately stimulate and depress mankind

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Edward R. (Ned) Dewey is in his office at the Foundation for the Study of Cycles.

in the mass. These same forces also affect things like plant life, weather and disease. To say what they are at this stage would be rash."

Gertrude Shirk, longtime editor of *Cycles,* the monthly bulletin of the foundation, joined the discussion: "One of the odder cycles in the biological worlds is displayed by the sooty tern. It breeds on Ascension Island off the west coast of Africa. Because Ascension is between South America and Africa, the U.S. Army Air Forces selected it in 1942 as a good stopover point for short-range bombers. The planners were well aware that this was the nesting ground of the sooty tern, but they assumed—naturally enough—that this was an annual event, and that for most of the year the birds would present no hazard to the planes."

This turned out to be wide of the mark, and the B-25s and B-26s ran into sky-blackening flocks of terns at the most unexpected times. Turning to James P. Chapin, ornithologist with the American Museum of Natural History, the Army Air Forces learned that sooty terns do not breed once a year, but rather every 9.6 months on the average (this same bird, in other parts of the world, experiences cycles of varying lengths). Why should these terns differ so sharply from robins and the rest? Miss Shirk said: "We just don't know."

The author is a California-based writer specializing in science.

Dewey added, "We have evidence that forces of some sort—whatever their real nature may be—do exist, and it runs like this: many things fluctuate in waves or cycles that are so dominant, so regular, and have repeated so many times that they cannot reasonably be chance. Some of these nonchance cycles are no doubt caused by feedback, or by predator-prey relationships—as the abundance of the Canadian lynx may depend on the abundance of the snowshoe rabbit, its favorite food. That is, some cycles are caused by factors internal to the organism itself, or by factors obvious in its immediate surroundings. On the other hand, there are hundreds of cycles which, for one reason or another, cannot have an internal or immediate cause. In such cases we are forced to conclude an *external* cause."

Among biologists, the question of whether external or internal causes are primary in influencing the rhythms of plants and animals is still a matter of some controversy.

Miss Shirk spoke again of oddly timed cycles. "Two-year cycles are not at all uncommon," she said. "And yet people who find an annual cycle quite acceptable have to make a tremendous intellectual leap to visualize a two-year or a half-year cycle. But these are just as real. At the same time, people have no trouble accepting the idea that they have good days and bad days in a recurring pattern."

Biorhythms taken seriously

These cycles in an individual's physical and emotional well-being, now known as biorhythms, are being taken seriously by some airlines and factory managers, both here and in Japan. Small calculators now on the market are designed to help people anticipate their good and bad days.

In 1971 Dewey published a summary of his work in a four-page leaflet, "Why Study Cycles?" He explains his belief that most cycles are caused by external forces (however difficult they may be to identify), and the importance of looking more deeply into these mysteries.

He argues that cycles cannot be chance because accepted statistical tests show that many of the observed cycles could not be chance more than once in 20 times, 100 times, even 1,000 times. The 9.2-year cycle found in prices of common stocks, for example, could not arise by chance more than once in 5,000 times.

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He points out that cycles repeat time after time with great regularity. There is a 9.18-month cycle of ton-miles of freight carried by the Canadian Pacific Railway that has repeated itself 49 times.

Cycles normally repeat over as long a span of time as figures are available. There is a 17.33-year cycle in the thickness and thinness of the sedimentary deposits at the bottom of Crimea's Lake Saki that goes back to 2295 B.C. The cycles are a step in each segment.

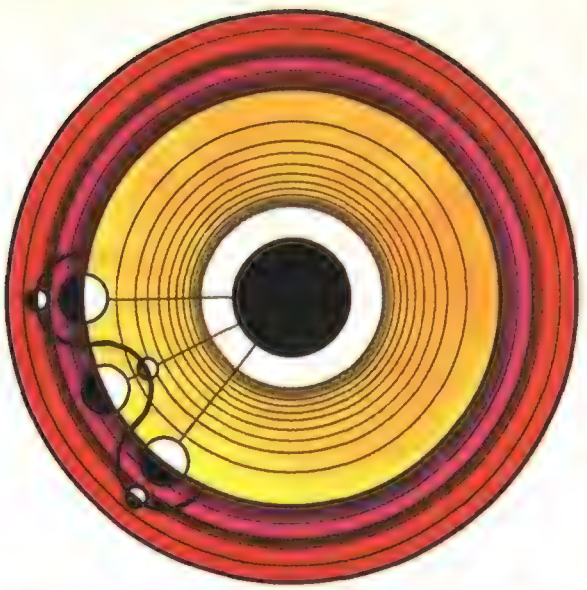
At the same time, the length of cycles (their periods) are essentially constant no matter how long the span of the data. There is an 11.2-year cycle in the index of international battles that has repeated itself since before the death of Christ until now.

Dewey shows that cycles tend to persist throughout changing conditions. Thus the 16.67-year cycle in the prices of wrought iron in England has continued from 1288, through the Industrial Revolution and into the atomic age.

It is, of course, of the essence of statistical reasoning that there is no such thing as absolute proof. We can only state the limits of confidence that we can place in a particular result. Dewey felt strongly that more than chance must be involved.

The implications that Dewey sees in cycles are fundamental. If he is correct, order, regularity and pattern exist in many types of phenomena hitherto thought to be random. A discovery of this sort would be akin to the discovery

The lives of many animals, particularly insects, are closely governed by cycles.



Astronomical bodies go through cycles, some of which may cause ice ages.

by the ancients that the planets (so-called from the Greek word meaning a "wanderer") have entirely regular and predictable movements, or that the elements can be arranged into a periodic table. Dewey says he can think of nothing that will extend order into more different areas, more different disciplines, more different phenomena, than cycle study.

If these cyclic forces are for real, there is a much greater interrelationship within nature than has been realized. The same cycles appear in many different natural and social sciences. The implications are of a wholeness, instead of the emphasis that we so often see upon smaller and smaller sections of knowledge.

The event that first started Dewey on the study of cycles occurred in the early 1930s. Then a government economic statistician, he came across an abstract by Professor Ellsworth Huntington of Yale University of a conference that had been held in 1931 in Canada. This called attention to the cycles—then well known to biologists—in the abundance of game animals. Dewey immediately saw the similarity between game cycles and the economic fluctuations that he was trying so desperately to understand. He had found his life's work.

Dewey worked to establish the Foundation for the Study of Cycles in 1940. He persuaded the Boston financier Copley Amory, who was especially interested in the varying abundance of game on his Canadian preserve, to make an initial contribution of $500. Other distinguished contributors followed.

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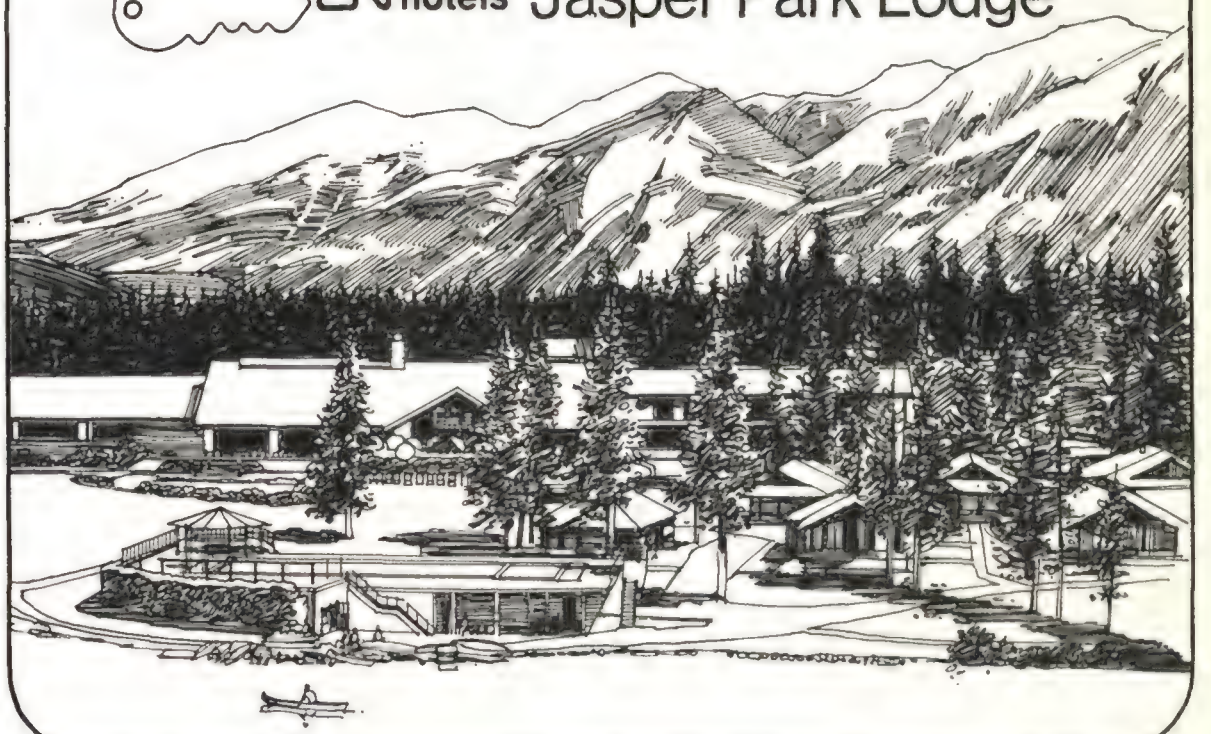

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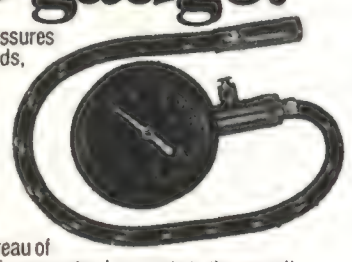

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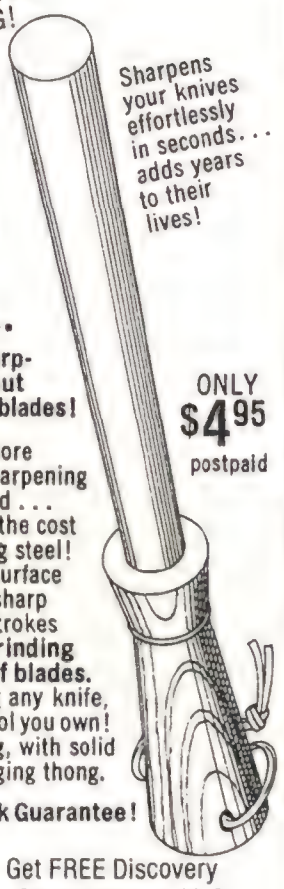

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small staff did cycle studies for individual corporations, but Dewey felt he should abandon that. The corporations, for proprietary reasons, refused to have the results published, and Dewey felt that burying results was no way to advance any science.

So he converted the foundation into a nonprofit organization entirely dependent on individual contributions. *Cycles* magazine, and the more scholarly *Journal of Interdisciplinary Cycle Research*, are supported in the same way.

Because Dewey deals with some series that extend over centuries, he handles an enormous volume of data, and in recent years he has made more and more use of computers. World literature on cycles has grown enormously. For biological rhythms alone, the foundation has references to some 30,000 papers, and the library has much of this material.

Dewey is gratified that two universities have entered the field. The School of Medicine at the University of Southern Illinois has established a department for cycle study, and the University of Pittsburgh has established its own Center for Interdisciplinary Cycle Research, of which Dewey serves as a director.

I asked him if he would take any different course if he could start again, "Oh, no. I've had a lot of fun; I've had the feeling that I was doing something really important."

I asked Dewey what plans he had for the ultimate future of the foundation, after he is gone.

"Oh," he said, with a sparkle in his eye, "I expect to live forever." If he does or doesn't, the foundation will need continued support, including that of new members who wish to keep themselves informed in the field.

Human beings experience a number of cycles. Some now believe that a better knowledge of these can enable us to predict our "good" and "bad" days.

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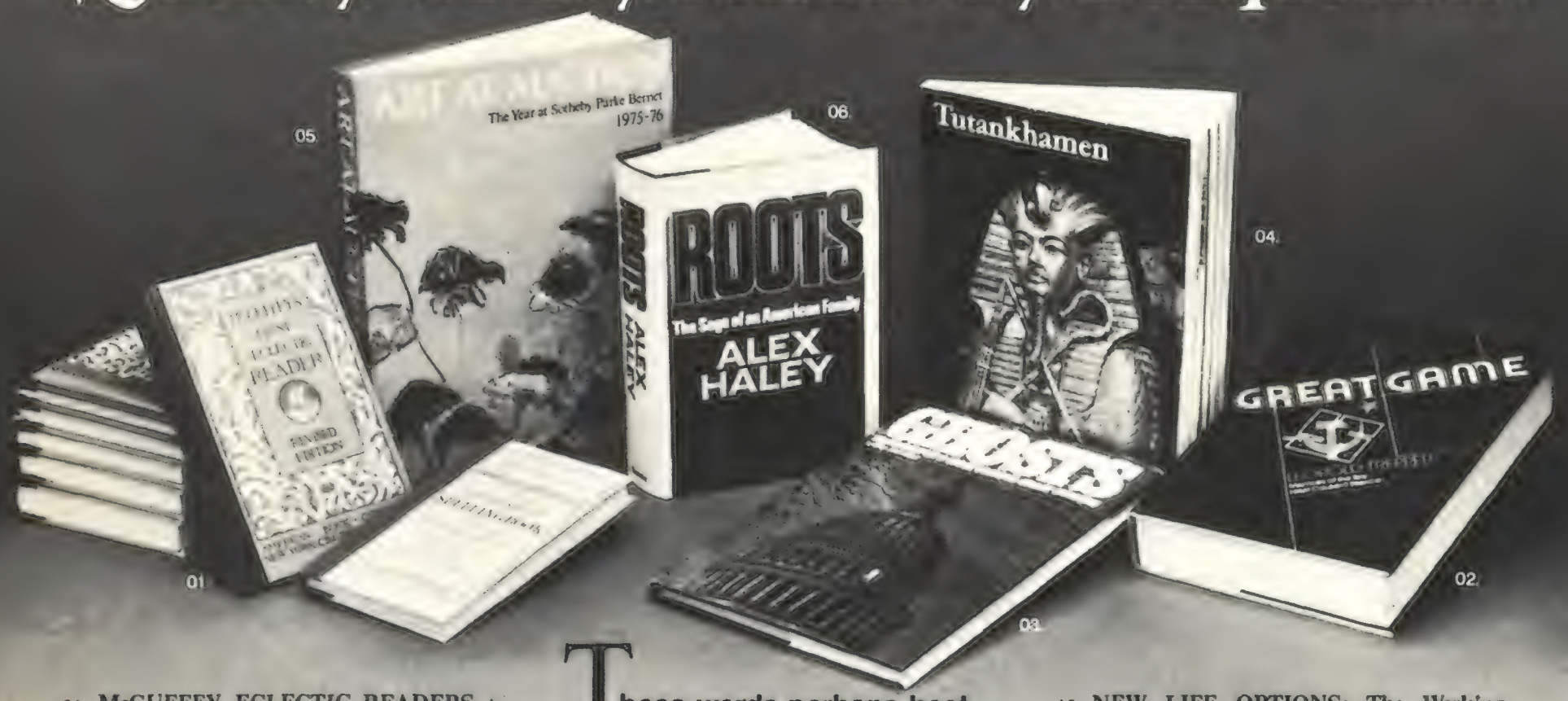

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By Allison Lockwood

Pantsuited pioneer of women's lib, Dr. Mary Walker

Civil War medic, often arrested for not dressing "like a woman," but was only female to win Medal of Honor

"Why don't you wear proper clothing? That toggery is neither one thing nor the other!" So General William Tecumseh Sherman greeted Dr. Mary Walker in the jaunty pantsuit she wore as a surgeon during the Civil War, the only woman ever to win the Medal of Honor.

Neither the General nor anyone else ever persuaded Mary Walker to give up her "garmenture of dual form," as a contemporary journalist euphemistically referred to the trousers she wore during her military service and, indeed, to the end of her life after World War I. In that half century she became, largely owing to her garb, almost as much a Washington landmark as the Capitol itself.

A century before the label's invention, Dr. Walker was a "women's liberationist," an activist in every sense of the word, who devoted the energies of a lifetime to emancipating herself and her "sisters," as she called them, "from the bondage of all that is oppressive." According to her, and other reformers of the period, female bondage in the 19th century took two main forms: constricting, "unhygienic" clothing which called for dress reform, and denial of the right to vote. At one point the two causes were united in a single organization, "The Mutual Dress Reform and Equal Rights Association."

Active in both movements, Dr. Walker stood out from all her associates because of her costume. The genteel, gathered-at-the-ankle pantaloons recommended by Amelia Bloomer in the 1850s were too tame for the little doctor who adopted straight, tailored, masculine-style trousers which infuriated her contemporaries, especially the males. For half a century American readers were entertained by newspaper accounts of the arrests and other encounters stemming from Mary Walker's pants. Humorist "Bill" Nye labeled her America's "self-made man."

Dr. Walker's eminently practical war uniform consisted of trousers topped by a neat, military-style tunic ending in a modest knee-length overskirt. At the close of the war she was arrested in New York for "impersonating a man." She defended herself briskly, calling the female corset she abhorred a "coffin" contrived of "iron bands." The swaying, leg-revealing hoopskirt she termed an invention of "the prostitutes of Paris." She concluded her defense by claiming the right "to dress as I please in free America on whose tented fields I have served four years in the cause of human freedom." The judge advised New York policemen "never to arrest her again," and Mary Walker, according to the *New York Times*, departed "under a storm of applause."

She hit the papers again as the result of a dog bite. "That curious anthropoid, Dr. Mary Walker," as a *Times* reporter referred to her, was blamed for the incident by having willfully exposed her legs in her "best Summer trousers," and sympathy was expressed for the dog! "With skirts, the Doctor would have been safe."

Except for a few curls she retained so "everybody would know that I was a woman," Dr. Walker by the 1870s had given up virtually all concessions to female dress and appeared in frock coat and trousers by day and in full male evening dress on the lecture platform and at evening social affairs.

It was this insistence on wearing masculine-type clothing, while expecting to be accepted and treated as a lady, that so riled Mary Walker's contemporaries. "Clad in the majesty of trousers and the splendor of a frock coat," fumed an editorial writer, half seriously, "while Dr. Walker represents herself outwardly to be a man, she claims to be a woman whenever she can thereby appropriate any of the rights of the female sex. . . . What must be demanded by all who have the interests of the Republic at heart is the refeminization of Dr. Walker. Her trousers must be taken from her—where and how is, of course, a matter of detail."

Mary in 1912, in dress suit, wearing Medal of Honor won as Civil War medic.

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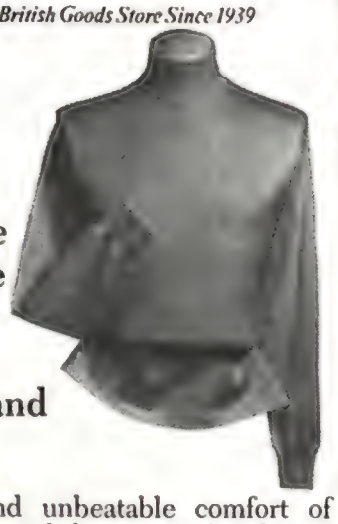

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Dr. Walker took plenty of abuse over the years. She could also dish it out. As an 80-year-old woman she was introduced to the Assistant Secretary of the Navy, Franklin Roosevelt. Promptly she informed him of her low regard for his cousin "Teddy," whom she detested.

Dr. Walker's restless life began sedately enough in 1832 at Oswego, New York, where her Yankee parents, both descended from Pilgrim stock, conducted a school. At 16 she herself was teaching, but left this to overcome the many obstacles then in the path of a woman bent on a career in medicine. In 1855 she emerged from the Syracuse Medical College holding a medical degree, the only woman in her class. (Elizabeth Blackwell, the first woman physician in America, received her medical degree in 1849 from Geneva College of Medicine.) Primitive by our standards, Mary Walker's training was par for the time, but her first practice, in Rome, N.Y., with her husband, Albert Miller, was small. The American public was not yet ready for women doctors, and neither was the army, as she discovered when she arrived in Washington at the start of the Civil War seeking a commission as an army surgeon.

Many dedicated American women were to serve in hospitals throughout the conflict, under atrocious conditions and sometimes close to the battle zones, but as nurses—not as physicians. Denied a surgeon's contract, Dr. Walker went to work in whatever medical capacity she could be useful. A stint in the makeshift hospital set up in the corridors of the old U.S. Patent Office Building, during the early war days, was followed by service at Warrenton, Virginia. Disgusted by the care some of the men received in field hospitals, she had many of them packed off to Washington by train.

In the 1880's Mary Walker risked arrest by going everywhere in pants.

A "man for man" exchange

Ordered in 1863 to Chattanooga, Dr. Walker actually replaced a male medical officer in an Ohio infantry regiment. On one of her missions, she was captured by a Confederate patrol and packed off to Richmond where she languished, along with other Federal officers, in a prison known to its inmates as "Castle Thunder," a converted warehouse on the banks of the James River. During her four-month stay the *Richmond Examiner* ran a story of their female POW, complaining, among other things, that she refused to assume garb "more becoming to her sex." It was always a source of pride to Dr. Walker that she was exchanged in 1864, "man for man," for a Confederate officer.

The Medal of Honor was awarded to Dr. Mary Walker by President Andrew Johnson at the end of the war, and she wore it proudly all her life. In 1917, when she was 85 and nearing the end, a government review board withdrew her medal, along with those of 900 other Civil War veterans, claiming they had been improperly awarded—in her case,

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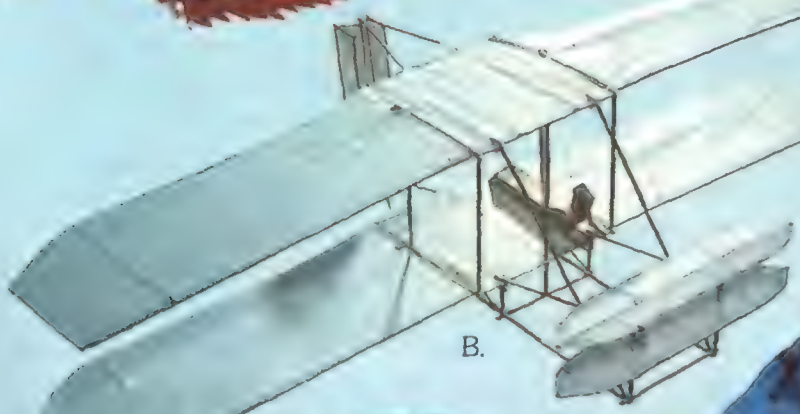

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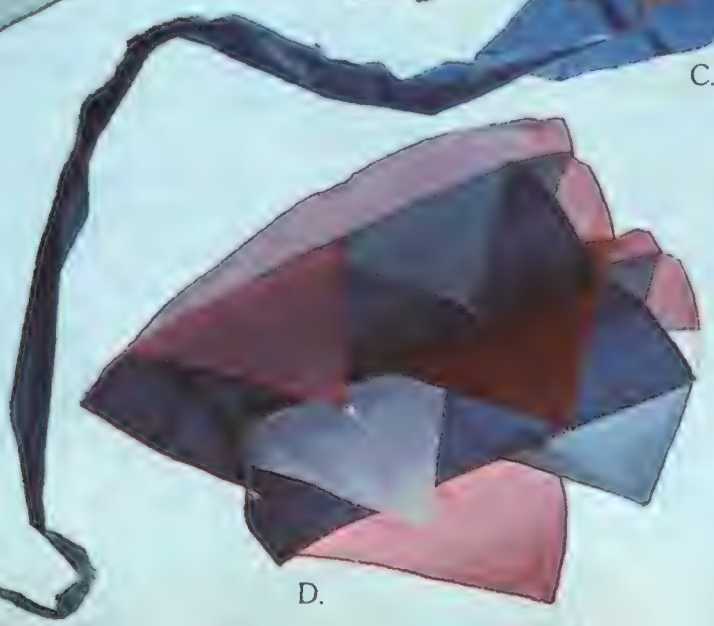

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Pair of *New York Times* cartoons shows Mary being grabbed by a cop

on a question of her status as a member of the army or a contract doctor. Dr. Walker not only refused to relinquish her original medal or the later design given her in 1907, but vowed she would continue to wear one every day, "and the other I will wear on occasions."

Dr. Walker's opinion on how to free 19th-century women from the bondage imposed by their clothing and by tradition she expressed in two books with unusual titles: *Hit* (1871) and *Unmasked; or the Science of Immorality* (1878). She railed against the cruel corsets, tight garters and other underpinnings that "shackled and enfeebled" the female.

As her own practical contribution to dress reform, Mary designed what she called her "Dress Reform Undersuit," calculated not only to improve female health generally but also to discourage both seduction and rape. "The linen," she wrote, "is made with a high neck and loose waist, and whole drawers, and long sleeves with wristbands attached; thus making a complete undersuit in one garment. The drawers are folded over the ankles and the stockings adjusted over the drawers, thus keeping the ankles warm and also keeping the stockings arranged without elastic or other bands, or any troublesome or injurious arrangement, most of which impede the circulation and produce varicose veins, and

for wearing trousers, while less "modest" hoopskirted women go free.

weariness in walking." Over this undersuit was to be worn a sensible suit consisting of "pants made like men's, either buttoned to the waist of the undershirt or arranged with the usual suspenders. The dress is made to hang free of the body, the waist and skirt of one piece like a sack coat and falling to the knees; thus preventing it being stepped upon while descending stairs, or of becoming soiled in rainy days—but principally because of a needed relief to women from its shortness."

Education for women was advocated by Mary Walker on the most practical ground and one with which she herself was quite familiar—the need to earn a living. "Not only every son but every daughter should be given a practical knowledge of some business whereby they can support themselves," she wrote, adding, moreover, that they should receive equal pay for equal work instead of "the pittance paid for woman's work."

As for marriage, Mary believed "there should be perfect freedom for woman to select a partner for life in a straightforward, honest, and honorable manner." As do feminists of today, she observed that in American homes the work of women was not only never finished but also undervalued. "One, and I may say the great reason why the mass of women are so dissatisfied with their domestic

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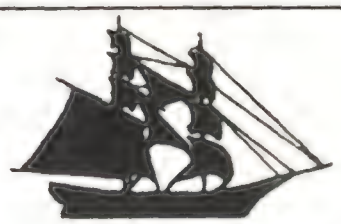

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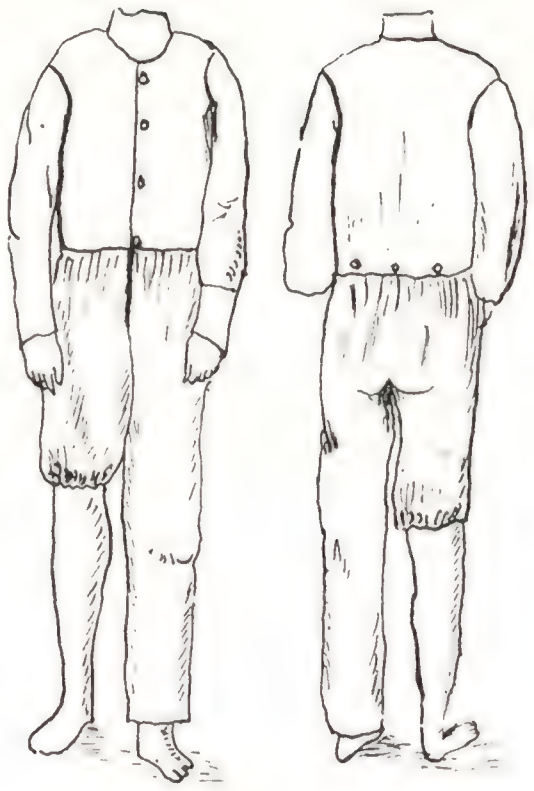

Fore-and-aft views of Dr. Walker's rape-proof "Dress Reform Undersuit."

duties," wrote Dr. Walker, "is because they are painfully conscious of the inability of men to duly appreciate the thousand cares, thoughts and anxieties of their position. Too well do women know the great mass of men feel that if they earn the money, they have performed the nine-tenths part of living, and whatever a woman does is only of minor consideration. . . ."

And what if this social contract called marriage failed to work? Why, divorce was the answer—the one she chose when her own marriage failed. "If it is right to be legally married, it is right to be legally divorced. . . . To be deprived of a Divorce is like being shut up in prison because someone attempted to kill you. It is just as honorable to get out of matrimonial trouble legally, as to be freed from any other wrong."

From the end of the Civil War through the 1870s Dr. Walker was part of the dedicated band of suffragettes headquartered in Washington, D.C., that included Susan B. Anthony, Lucy Stone, Mary Livermore and the attorney, Belva Lockwood, second woman to run for President, Victoria Woodhull being the first. The women worked ceaselessly, delivering speeches to whoever would listen, collecting signatures on petitions, besieging Congressmen in their offices, and staging demonstrations out of their national headquarters, the Central Women's Suffrage Bureau.

Frederick Douglass, the great black abolitionist, himself marched with the little group when they tried to register to vote in the nation's capital in 1871, basing their hopes on the passage of the 15th Amendment which the previous year had guaranteed that right to the emancipated blacks.

When the suffragettes lost their faith in an Act of Congress as their means of achieving the vote, redirecting their energies to the passage of a Constitutional Amendment, maverick Mary Walker decided to go it alone. She had made up her mind that it was merely illegal state and local laws that denied women the vote. This theory she termed her "Crowning Constitutional Argument," had copies printed up, and proclaimed it the rest of her life.

As the years marched on, Dr. Walker had to scratch hard to make a living. She fought hard for a government clerkship

Trio of early female activists: from left, the Reverend Susana Harris,

which failed to work out, each side blaming the other, but there are enough references to her unusual mode of dress to indicate she may have been discriminated against because of it. In 1898 she won a $20 monthly pension based on disabilities she charged to her wartime imprisonment in Richmond. She spent more time, as she grew older, at the old family farm at Oswego where, like many old ladies, she was the butt of cruel pranks. At 81 she outwitted an apparent attempt to tar and feather her.

Near the end of her long life, Dr. Mary Walker herself remembered those years when her youthful daring, strength and brains had captured the nation's attention. "Presidents, cabinet ministers and great generals were glad to meet and listen to me," she recalled, adding wistfully, "I was younger then."

At long last and late—she would be 145 this year—Congressional action has been initiated to restore Mary Walker's Medal of Honor.

Belva Lockwood, who ran for President in 1884 and in 1888, and Dr. Walker.

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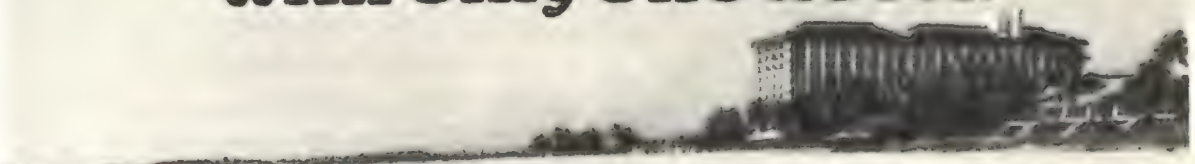

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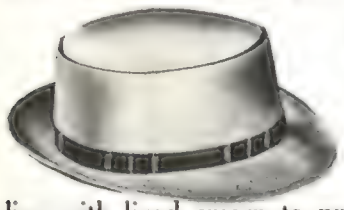

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Book reviews

America's Forgotten Architecture
Tony P. Wrenn and Elizabeth D. Mulloy
(National Trust for Historic Preservation & Pantheon Books, $20)

Unbuilt America
Alison Sky and Michelle Stone
(McGraw-Hill, $14.95)

To study the buildings of America is to study ourselves. Architecture is the living past in physical form and it can tell us as much as events recorded in books. It can tell us what we have become and what we hoped to become. It can make explicit many dreams and aspirations. *America's Forgotten Architecture* and *Unbuilt America* offer more insight into the American character than many of the historical books that appeared as part of our Bicentennial celebration.

At a time when we are especially concerned about the preservation of our physical heritage, *Unbuilt America*, by presenting more than 300 proposals—competition projects, works intended but never completed, and schemes just too far ahead of their time—preserves the unrealized. As George Collins states in the introduction: there is just as much validity in what a people believes as in what they actually do or did. An unbuilt design, especially if published, can be just as influential as something that was built.

Unbuilt America is a book about ideas —about vision, about imagination. In an alphabetical listing, with quotations by the architects, Alison Sky and Michelle Stone have gathered an encompassing collection of both plausible and impossible designs, from many competitions (the U.S. Capitol, the Cathedral of St. John the Divine, Grant's Tomb, the Centennial Exposition and our own Bicentennial) to a number of contemporary schemes concerned with the planning of cities (Colony on Mars under Plastic Domes, Slung City, Chemical City, etc.). The projects include works by the famous (Wright, Jefferson, Rudolph, Sullivan and others) and the unknown, while the drawings range from the simplest sketches to the polished style of the Ecole des Beaux-Arts.

Original plan for Washington Monument

While many might regret that some of the projects shown in *Unbuilt America* did not reach fruition, much of what *has* been built has been forgotten, rejected or ignored, largely due to misunderstanding and because "our hidden inheritance" is perhaps too familiar to be properly appreciated. *America's Forgotten Architecture* is thus a moving essay that seeks to document all the many varieties of architecture worth saving in this country.

We accept today, as we did not 50, 30, or even ten years ago, that architecture means more than what is represented by individual landmarks or noted buildings by famous architects. Our concept of environment, based on human needs for

stability, familiarity and sense of place, depends upon the whole fabric of our visual surroundings. The emphasis of *America's Forgotten Architecture* is therefore not on individual landmarks, but on vernacular architecture—railroad stations, houses, agricultural buildings, gas stations and mills—and on townscape, our own hometowns rather than museum villages.

Fortunately, it does more than chronicle the less-famous aspects of our architectural history. It not only provides the context, but it offers basics for the layman on how to understand the language of architecture. It tells us how to preserve, how to read the environment, and how to choose those elements necessary for effective preservation planning. The many handsome illustrations alone open our eyes to the wealth of architectural riches that constitute one of our great resources.

Both books remind us that buildings must do more than provide shelter—they must also nourish the spirit.

—*William Morgan*
Associate Professor of Fine Arts,
University of Louisville

American Jewish Landmarks: A Travel Guide and History, Volume I: Northeast
(Fleet Press, $18.50; paperback $8.50)

Jewish Landmarks of New York
(Fleet Press, $10; paperback $5.95)
Bernard Postal and Lionel Koppman

"Everyone loves tours of Jewish New York," confidently exclaims the brochure for an all-day excursion by bus that leaves "every Wednesday and Sunday, but never on Saturday, of course," for the Brooklyn of the Hasidim, a drive down Hester Street, and visits to historic synagogues, homes and to a ritual bath, with a lunch-hour stopover at a Lower East Side delicatessen whose name is honored throughout the world of kosher gastronomy. "How interesting is everyday life" in New York's Jewish community, the brochure concludes with an understatement.

Those anxious to learn just "how interesting" in New York or elsewhere on the East Coast could do no better before setting out on their own expedition than to become acquainted with the first volume of Postal and Koppman's *American Jewish Landmarks*, covering 12 northeastern states and the District of Columbia. It is part of a three-volume set, completed publication of which is scheduled this

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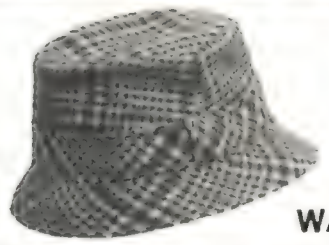

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year, in which the authors claim to have identified and described every place—literally, every place!—of Jewish interest, historical importance and cultural significance in the United States. And I have no reason to doubt them.

What's Jewish about Valley Forge, for instance; how to interpret the Hasidim; where to buy a denim prayer shawl . . . it all seems to be there. The curious are directed to selected items of Jewish appeal in museums and art galleries (including numerous displays in the Smithsonian complex), told where to look for Hebrew inscriptions on public buildings, and introduced to an array of public officials who are members of the Jewish community. Synagogues, recreation centers, schools, agricultural settlements and kosher restaurants are listed state by state and city by city among the thousands of entries compiled by the authors.

The entire section on New York City and its suburbs is being published in a separate volume as *Jewish Landmarks in New York*.

Postal and Koppman have done more than assemble a manual for sightseers. Tourist information is put in historical perspective in carefully researched, well-written essays that trace the development of the Jewish community in each state. *American Jewish Landmarks* may not offer the complete history of American Jewry, but the set will certainly serve as an important reference work and, as detailed history, will doubtlessly become a point of departure for the research of local historians. The historical essays are also crammed with enough anecdotes to keep the most general reader fixed in an armchair for more than a few evenings.

The story of the Jewish experience in America is followed from the landing of 23 Marranos from Brazil at New Amsterdam in 1654, to the arrival of refugees from the Soviet Union in this decade. From the first, assimilation took a toll of Jewish communities usually too small to form *minyans*. Subsequent legal discrimination, which remained in some states well into the 19th century, could not erect a barrier to achievement by American Jews in the cultural, intellectual, commercial and political life of their country. The authors describe acrimonious disputes that divided the Jewish community—disputes between synagogues on fine points of doctrine, between German and East European Jews, between Zion-

ists and non-Zionists. They trace the movements of the Jews within the cities—New York, Washington, Philadelphia, Boston—and ultimately to the suburbs, and contribute a frank discussion of the problems of neighborhoods in transition and the clash between black newcomers and established Jewish communities in New York.

The contributions of Jews to every aspect of American life are so obvious and so integral to the national experience that some may be put off by the apparent parochialism of *American Jewish Landmarks*. Herbert Gold, the novelist, commented recently, however, that in order to survive as a small minority in a very large country, American Jews need a special history in addition to the one that they share with other Americans. The authors suggest that American Jews "never dissolved in the melting pot but are imbedded in two cultures, Americanism and Judaism" that have mightily enriched one another. Perhaps America also offered them—and others as well—an opportunity nearly unique in the world: both to stand apart and to be a part . . .

—Robert Rinehart
Historian, Foreign Area Studies
Program, The American University

The Train's Done Been and Gone:
An Annapolis Portrait, 1859-1910
Marion E. Warren and
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Disfarmer: The Heber Springs Portraits 1939-1946
Julia Scully and Peter Miller
(Addison House, $22.50)

The Train's Done Been and Gone is a backward look at Annapolis through photographs taken during the last half of the 19th century.

As happens at the outset of most arts, its practitioners chose a direct approach. Thus, it is probable that the anonymous photographers who worked in Annapolis during this period saw their wet plates and lenses as a medium for simply making literal recordings of brick and cement, wood and stone, as erected by man for his comfort.

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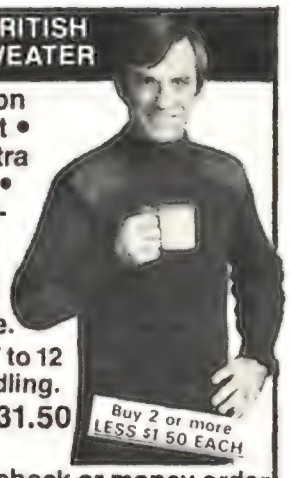

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use, and the very building where Washington resigned his commission. Through the years, Annapolitans have been kind to that building. And now it seems the favor has been returned. Every traveling photographer and every Victorian amateur who set up a darkroom in town was drawn to that aerie—overlooking a pristine bay and a city whose streets lead to the statehouse with spokelike regularity.

The city had a resilience that enabled it to survive; and this, it turns out, is the real subject of these early photographs.

Fortunately, this truth was quickly being learned. By 1898, *Scribner's Magazine* could confidently say: "Printing can only record what man knows or thinks; photography can record many things which man does not know and has not seen, much less understood."

A man who understood just what *Scribner's* had in mind was Mike Meyer (1884-1959), a virtually unknown photographer who set up a portrait shop in the tiny Ozark foothills town of Heber Springs, Arkansas, in 1914. There he worked until his death under the name Disfarmer, by which name, one assumes, he dealt with the guilt of not accepting his family's ancestral occupation, tilling the land. As you might expect from such an etymology, Disfarmer was the town weirdo; he was friendless and lived his last 45 years in the small room behind his Main Street shop. He thus paid dearly for the aesthetic distance between his subjects and himself.

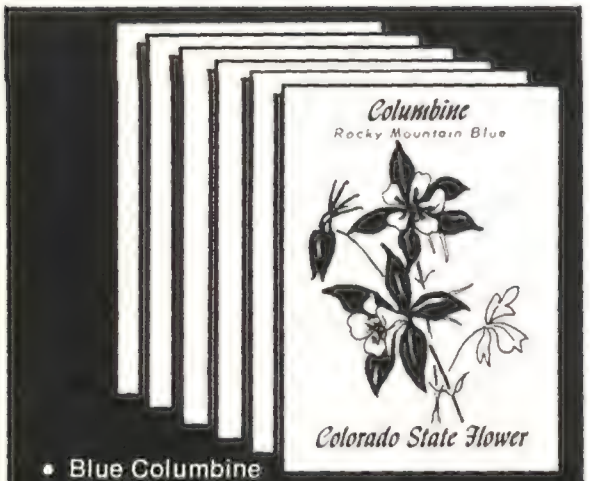
This collection of Disfarmer prints, all made from glass plates (stubbornly used by Disfarmer long after sheet film became available), was discovered by New York photographer Peter Miller in 1974. It consists solely of studio portraits taken during the years of World War II. What it shows is a genius who discovered the same truths about direct, confrontation photography as are usually associated with Irving Penn and Diane Arbus. The difference is that Disfarmer neither used props or exotic locales nor sought out the emotionally and physically deformed. It was his aim to show the strengths and vulnerabilities of the subsistence-level cotton farmer. Another difference was that Disfarmer's subjects sought *him* out, usually as part of a Saturday outing. Picture-taking was a fad to be enjoyed along with a ride into town and a hamburger at the drugstore counter. Today, these figures stare back at us from the pages of this volume, demanding that we overlook their weather-beaten skin, their wrinkled stockings, and the wildly inappropriate soldier uniforms (complete with Sam Browne belts) on their five-year-old children. It is impossible to disregard their frozen expressions. And "Weep not for me" is surely what they are saying.

—*Michael Olmert*
Annapolis-based free-lance writer

The Faces of Eve
Judith Fryer
(Oxford University Press, $11.95)

Women and Marriage in Victorian Fiction
Jenni Calder
(Oxford University Press, $10)

Two women scholars have written two extremely interesting books on what it must have been like to be a woman in the 19th century, one about Victorian England, the other about the United States. Their conclusions are drawn, not from sociological or historical accounts,



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but from the novelists of the period.

Judith Fryer, in *The Faces of Eve,* examines first the Adamic myth in American literature—the figures we find in Melville and Cooper, Twain and James—who are self-reliant, ancestorless, natural men living in a romantic New World Eden. She notes that the critics have neglected to look for or describe the Eve figure in the myth, and she finds that Eve is there, in a number of guises.

Male writers were responsible for the creation of these varieties of Eve which surely they caught from their patriarchal society's way of looking at its women. Only at the turn of the century did female writers begin to create recognizable women. Kate Chopin's real *person,* Edna Pontellier in *The Awakening,* made her appearance in literary history in 1899. With that book it becomes clear that women see female characters (and therefore their own lives, of course) differently from men.

With Kate Chopin and the women writers who succeeded her in the 20th century, the unreality of many of the faces of Eve becomes apparent.

Jenni Calder begins with Tolstoy's *Family Happiness,* and then explores family and marriage in the work of the Brontës, Thackeray, Dickens, Mrs. Gaskell, George Eliot and George Meredith. All of them agree in seeing the family as the central structure in Victorian life, and the situation of women in the family as persons denied their identities except as wife and mother. Women are seen to be "quiescent, ambitious, immoral, peculiar . . . multifariously engaged in a contest with an overwhelmingly paternalistic society." If they are wives, they are insecure wives, women for whom independence would be perilous. They are economically vulnerable (as Jane Austen knew), at the mercy of financially strategic marital arrangements (as in Thackeray), but at the same time often forced by their situations in marriage into deceit, into malignant and serpentine acts (the English Eve?) which poison further the already malignant familial air.

Only Mrs. Gaskell and George Meredith looked deeply into the unexplored regions of women's lives. Dickens, often considered to be a novelist of social history, failed to do more with his women than make shallow portraits.

In 1870 women were finally permitted to own property and money in their own name in England. Meredith's portraits of women in *The Egoist,* for example, dramatize their new place. Even more, his revolutionary view of the "mutual likeness" of men and women in *An Amazing Marriage* provides a heroine who is capable of living her own life, drawing her errant husband back to her by her very independence. This novel appeared in 1895, prefiguring emancipated women in 20th-century fiction and life.

These views of literary history—and, therefore, social and cultural history—might be called advocacy criticism, since there is in both books a sense of disaffection with male novelists who have hardly known their female characters, or else have known them only through the mistaken eyes of myth, and a consequent feeling that women are best able to write accurately about women. Calder and Fryer may well be right: their evidence is all to that view, and I am not one to find fault with it. I liked both books; I know more about 19th-century women as a result of my contact with them.

—Doris Grumbach
Novelist, teacher and critic

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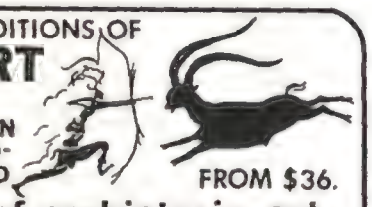

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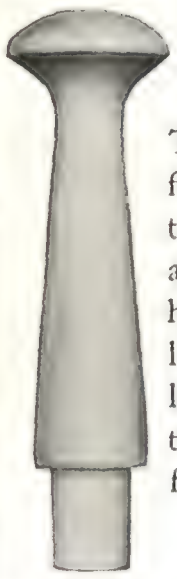

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Additional reading

Versailles (p. 38)

Louis XIV by Ragnhild Hatton, Thames and Hudson (London), 1972

The Sun King by Nancy Mitford, Harper & Row, Publishers, 1966

Versailles by Christopher Hibbert and the Editors of the Newsweek Book Division, 1972

Agricultural revolution (p. 48)

The Farmer's Last Frontier by Fred A. Shannon, Holt, Rinehart and Winston, 1966

The Farmers' Frontier by Gilbert C. Fite, Holt, Rinehart and Winston, 1966

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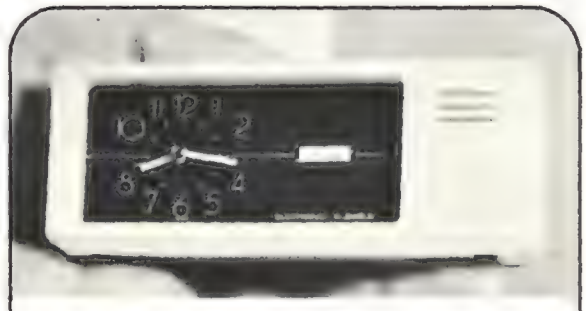

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Fogg Art Museum, 1966

Surinam (p. 78)

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Smithsonian highlights

Divisions of Performing Arts and Musical Instruments

• Willie Dixon is the guest artist in The Blues series, March 6, 8 P.M., Baird Auditorium, Museum of Natural History.

• "A Tribute to Charlie Parker," with Charles McPherson and Phil Woods, will be presented in the Jazz Heritage concert series, March 13, 4:30 P.M. free workshop, 8 P.M. concert, Baird Auditorium.

• "Ricercare," an ensemble of Renaissance and early Baroque wind instruments, presents a program of Italian Renaissance works, 1500-1600, March 13, and German and Italian works from about 1600 on March 14. Both concerts are at 8:30 P.M., Hall of Musical Instruments, Museum of History and Technology.

• The American Popular Song series presents "Asleep at the Wheel," March 20, 8 P.M., Baird Auditorium.

• The Smithsonian's Division of Musical Instruments features violin sonatas by Geminiani, March 20, 8:30 P.M., Hall of Musical Instruments, Museum of History and Technology.

For additional program information, call (202) 381-5395. Senior citizens, students and Resident Associates are entitled to discounts.

Puppet Theater, Arts and Industries Building

"Beauty and the Beast," featuring settings of medieval splendor and a large cast of elaborately costumed marionettes, continues through mid-March, Wednesdays through Sundays. The theater then closes in preparation for a new show. For program times and reservations, call (202) 381-5395.

Regional Program in Portland, Oregon

The regional activities of the Smithsonian National Associate Program in Portland, March 7-17, include:

• a performance by the Smithsonian Chamber Players of baroque, classical and early romantic music on instruments of the period

• "Artists and Their Studios," an exhibition and a related lecture developed by the Archives of American Art.

• a lecture on the Hirshhorn Museum and Sculpture Garden by Charles Millard, its chief curator

• an illustrated lecture by Marc Pachter, historian and originator of the highly acclaimed National Portrait Gallery exhibit, "Abroad in America: Visitors to the New Nation 1776-1914"

• an exhibition and lecture by the Smithsonian Family Folklore Center which will include interviews with local Associates.

Museums and cultural and scientific organizations interested in cosponsoring regional programs should write: R. H. Angle, Smithsonian National Associate Program, 900 Jefferson Drive, Room 1201, Washington, D.C. 20560.

Traveling Exhibition Service

Over 600 organizations in all corners of the United States show exhibitions sponsored by the Smithsonian Institution Traveling Exhibition Service. The subjects, ranging from art to science to history, reflect the diversity of the Smithsonian Institution. For information on bringing an exhibition to your community, contact: Smithsonian Institution Traveling Exhibition Service, Washington, D.C. 20560.

• Austin, Texas—"Contemporary Stage Design, U.S.A." is a comprehensive exhibition of works by such stage designers as Donald Oenslager, Boris Aronson and Jo Mielziner (University of Texas, through March 20).

• Brunswick, Maine—"Tunisian Mosaics" features 19 mosaics from the second through fourth centuries A.D. (Bowdoin College, March 12-April 24).

• Iowa City, Iowa—"Romaine Brooks: Thief of Souls" is an exhibit of ten paintings and 8 drawings executed by this expatriate artist whose portraits chillingly convey the character of the subject (University of Iowa, March 19-April 17).

• Logan, Utah—"Molas" features the brilliantly colored costumes characteristic of the Cuna Indians of Panama (Alliance for the Varied Arts' Community Art Gallery, March 5-April 3).

• Madison, Wisconsin—"Edvard Munch: The Major Graphics" is an exhibit of etchings, lithographs and woodcuts executed by this major printmaker (Elvehjem Art Center, March 9-April 17).

• Mobile, Alabama—"Lion Rugs from Fars" features 41 rugs which exemplify Iranian folk art of the 19th and 20th centuries (Fine Arts Museum of the South, March 19-April 17).

Museum of History and Technology

"First Ladies' Jewelry and Accessories" is an exhibit located near and complementing the First Ladies Hall. Sixteen first ladies are represented by jewels, fans, scarves and other accessories that were their fashion trademarks. Included is the signature scarf designed by Frankie Welch especially for Betty Ford and Abigail Adams' blown-glass necklace which was painted to simulate pearls.

Special to Smithsonian Associates

Upon arrival at the Smithsonian, members are invited to register at the Associates Reception Desk, located in the Smithsonian castle on the Mall. Here, from 10 A.M. to 4 P.M., seven days a week, a special orientation packet may be obtained from a staff prepared to assist you. A lounge area is also located in this building.

Luncheon is available to Associates seven days a week in The Court, the members' dining room located on the ground floor of the Museum of Natural History.

Associates planning a future trip to the Smithsonian may write or call for advance information: Associates Reception Center, Smithsonian Institution, Washington, D.C., 20560; telephone (202) 381-6264. Lists of museums in the United States may be obtained by writing the Museum Reference Service at the same address.

If you have misplaced your membership card, the Associate Receptionist in the castle will be happy to issue a replacement upon presentation of your SMITHSONIAN magazine address label. Membership cards are required for discounts in the museum shops and luncheon in The Court.

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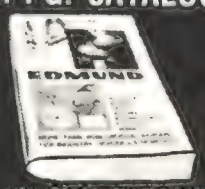

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Foreign Charter Tours

Mexico City and Yucatan—November 4-15 or November 19-30: A study program in Mexico City concentrating on Aztec and Toltec cultures; visits to the Mayan ruins of Chichén-Itzá, Uxmal and Palenque (originates in Mexico City) • **Australia and Tahiti**—April 11-May 5: Sydney, Melbourne, Canberra and Papeete; "lifeseeing" seminars and excursions into the countryside; choice of side trip to Great Barrier Reef, or Adelaide overland to Alice Springs • **Istanbul and Asiatic Turkey***—April 18-May 2 or October 10-24: An adventure tour including a five-day program on Byzantine and Ottoman Istanbul, followed by choice of travel seminars to Aegean Turkey, Cappadocia or the southern coast • **Russia***—May 9-23 or October 3-17: The Bolshoi, Moscow Circus, Hermitage; schools, factories and housing in Moscow, Leningrad and Tallinn • **Poland***—May 16-30: An unusual and fascinating experience including the ancient Baroque city of Cracow, the magnificent tapestry collection in Wawel Castle dating from the Romanesque period, and the romantic birthplace of Chopin. Visit the enchanting fishing village where Copernicus spent 20 years of his life and produced his most important work, and make a pligrimage to the Jasna Gora Monastery with the famous high altar of Our Lady of Czestochowa • **Paris and Provence***—May 26-June 6, September 26-October 10: Paris plus Avignon, Arles, Nîmes and Aix-en-Provence; museum seminars at the Louvre and Jeu de Paume; walking tours, excursions to the Loire, Chartres and Vaucluse • **Great Britain***—July 25-August 8 or September 12-26: The National Gallery, the British Museum, Tate, Victoria and Albert; London walking tours; choice of excursions to the English countryside; the best of London theater • Low cost of tours includes first-class hotels, most meals, sightseeing, lectures, theater tickets and air fare. Foreign tours are heavily subscribed, so write early for additional details concerning a specific trip to Smithsonian Associates Travel Program, A&I 1270B, Smithsonian Institution, Washington, D.C. or call (202) 381-5635 for information. *Optional predeparture courses will be available for those who are interested.

Domestic Study Tours

NASA Weekend—March 25-27: Special program with museum curators to explore the galleries of the new Air and Space Museum • **San Antonio Festival**—April 21-29: Enjoy a colorful celebration highlighting the blend of Anglo and Spanish cultures in this historic city; also visit the hill country around La Grange and Austin, including the LBJ Library and Ranch • **Chesapeake Bay Cruise**—May 7-14: View the scenic and historic bay from the deck of the *Independence* cruise ship with land excursions to Annapolis, St. Michaels, Smith Island, Williamsburg and St. Mary's City • **Grand Canyon Adventure**—May 20-30 or June 3-13: An exciting trip on the Colorado River with emphasis on ecology in May and river adventure history in June • **Yosemite High Country**—June 4-13: Explore high back country, under guidance of Yosemite Institute staff, in small groups suited to individual interests and hiking ability • **Wind River Mountains**—July 30-August 7: A horseback trip into the land of the mountain men; camping at 10,000 feet in the midst of turquoise lakes and high meadow wild flowers • **Connecticut Antiques**—August 20-27: Learn about 17th- and 18th-century architecture and decorative arts with visits to historic sites, restored homes and antique collections from New Haven to the Berkshires • **Coming in September** a historic tour of Nantucket and Newport, a hiking tour of scenic Oregon, and a boat trip on Idaho's Salmon River • **Washington "Anytime" Weekend**—Visit the nation's capital and tour the original Smithsonian building. Spend two nights at Loew's L'Enfant Plaza Hotel (reservations required ten days prior to weekend) • Write Associates Travel Program, A & I 1270B, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5635.

Foreign Study Tours

Jordan-Jerusalem—March 8-21: Archaeology in Jordan for one week; two weeks of historic sites in and near Jerusalem (accommodations and study at St. George's College) • **Russia**—May 31-June 22: Emphasizing art history in Georgia and Armenia • **Baltic, Norway and the Fjords**—July 30-August 18: Cruise on the *Argonaut* to Sweden, Estonia, Russia (Leningrad), Finland; spend a week in the fjords of Norway • **The Isles of Britain**—August 19-September 3: Cruise aboard the *Argonaut* from Edinburgh at Festival time to the Orkney, Hebrides, Scilly islands, Northumbria, northern Scotland, Wales • Write Miss Bliss Schumann, Foreign Study Tours, SI 123, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5520.

Air and Space Museum
The Museum is presenting free illustrated lectures on a variety of aviation and space-related topics during the lunch hour on alternate Wednesdays through the month of April. The Air and Space Forum series is held in the Museum's Theater from 12:30 to 1:30. For a list of dates and topics, call (202) 381-4222.

Renwick Gallery
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Musical Weekend in May
The sixth annual Musical Weekend cosponsored by the Division of Performing Arts and Friends of Music at the Smithsonian is scheduled May 13-15 (see p. 120, January issue). For reservations write: Musical Weekend, Museum of History and Technology, Room 4123, Washington, D.C. 20560.

Winter museum hours
The Smithsonian museums are open, 10 A.M. to 5:30 P.M. daily. The Zoo is open from 9 A.M. to 4:30 P.M. and the Anacostia Neighborhood Museum from 10 A.M. to 6 P.M. weekdays and 1 to 6 P.M. weekends.

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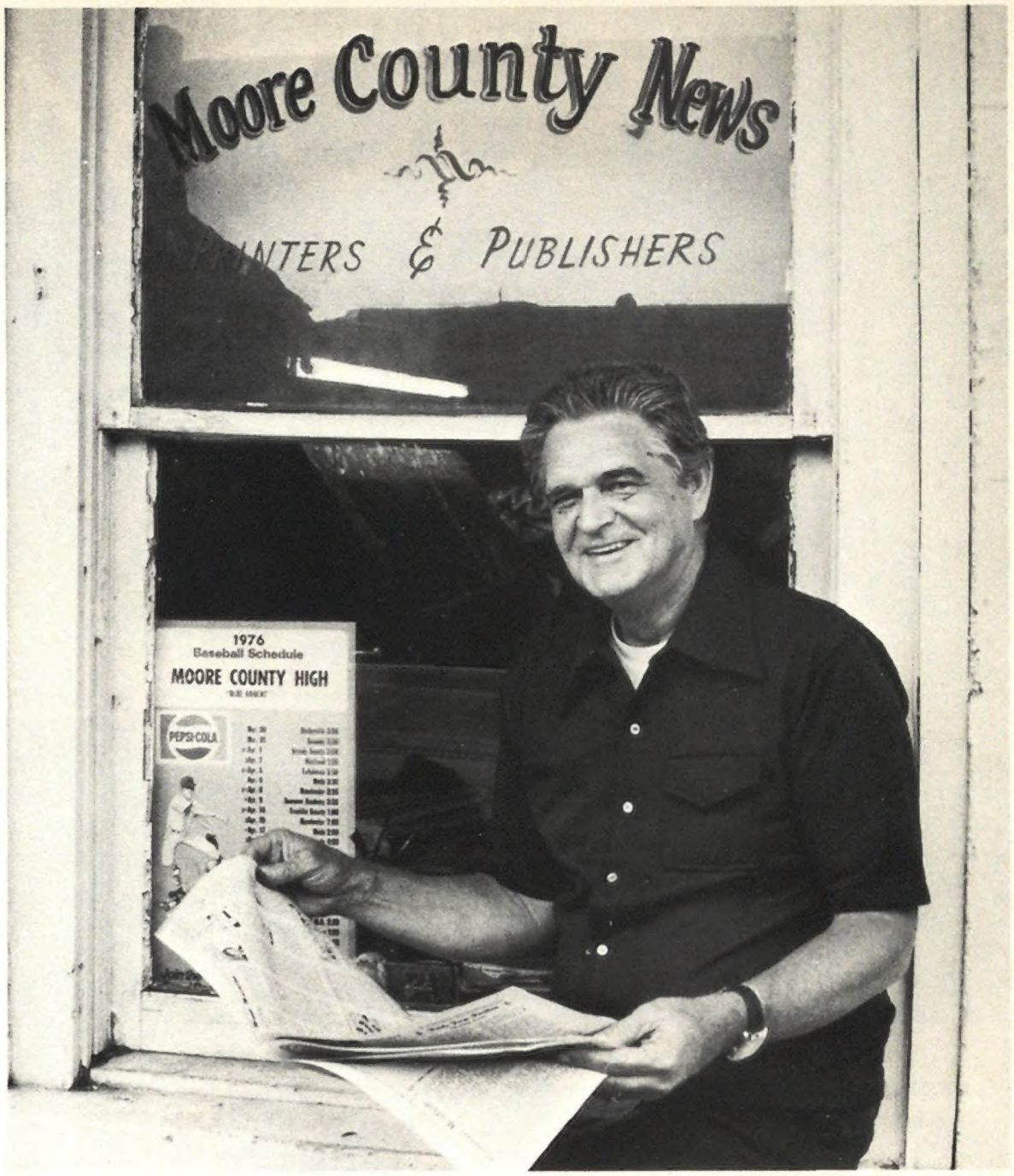

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By Mary Hamman

Nessie no, but Yeti yes: an abominable abdomen

It has been my fortune, at least in fancy, to have been assigned to report a number of the century's most adventurous searches: for the last of the great auks in Patagonia, for the fabled unicorn once rumored to be flourishing its horn in Ermeland, for extraterrestrial artifacts in Peru and for Noah's Ark in Turkey.

In no instance came real proof of the existence of the objects of our searches. I reported this quite frankly and think that I gained a reputation for reasonable skepticism and accuracy in presenting the facts of our expeditions and the results. Incidentally, SMITHSONIAN's article on Bigfoot or Sasquatch (January 1974) didn't turn up anything, either.

I was not invited to join the *New York Times'* much-publicized hunt for the Loch Ness monster last year and, for various reasons, I have no regrets. In the first place, it seems clear that if Nessie exists, she is a she. Everything points to this: she shows herself only to men, ignoring her own sex, because she knows men are more gullible and likely to take her seriously. No monster wants to be laughed at or pooh-poohed by a sister.

Besides, before the expedition, I overheard Betty Friedan in the ladies' room after a Nader get-together, plotting a Loch Ness strategy and decided that she had reached the same conclusion. Naturally, she would not want proof of a female monster to be unearthed—unwatered in this case—since there are enough of them in fact and fiction already.

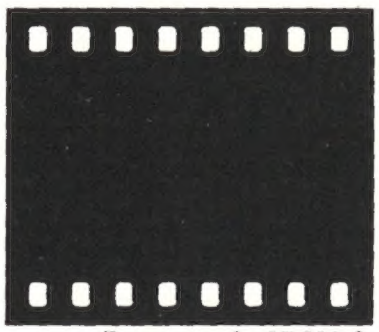
I therefore decided that the activist ladies would manage in some esoteric way to alert Nessie to lie low. It could be they sent her a copy of the *Times* which was brutal about her appearance (and failed to identify her sex) and, finding this news not fit to print, she sank to the bottom to sulk—700 or more feet down in her loch. It did not surprise me when the expedition was a failure, and I was glad not to be aboard.

These are credentials I want to present before telling about my most recent expedition: to track and find the Yeti, or Abominable Snowman, in the Himalayas. Rumors and lies may have reached you, so I shall give you my story.

As photographer, the backers, never a sensible lot, stuck me with Rosi. Granted, Rosi is courageous and a fine photographer (best known for his color, though on this expedition his triumphs were in black and white), but he speaks in an unidentifiable language, basic Basque perhaps, which probably doesn't matter too much as he talks only about meals he has eaten, meals he plans to eat and ingredients of interminable recipes.

To get down to the story: it is not true that Rosi and I had 28 Sherpas who carried 1,000 pounds of food each, up to 17,800 feet, the first base camp of Mt. Everest. We had fewer. Eight of them carried photographic equipment, four carried Rosi. We did not lose 20 Sherpas, only 16, and I think they ran away and made it to the bottom of the mountain. At any rate they did not founder on the rich food and fall over a cliff as has been conjectured. To Rosi's horror, they subsisted on their own jerked yak meat.

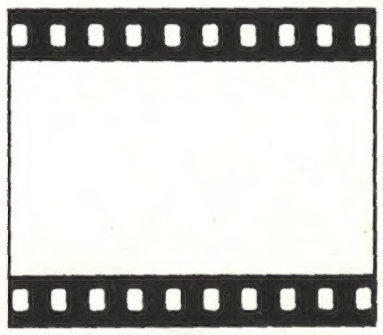
At the base camp we found tracks in the snow which looked definitely abominable. We were set up to photograph these when, with a great roar, an avalanche descended upon us, instantly burying Rosi. From under banks of snow, Rosi photographed the appalling scene below. His daring and spectacular picture



Base area, alt. 17,800 ft.
f. 11 at 1/25 sec. Plus-X Pan

has met with some criticism and snide comments. But I vouch for it.

When we had dug ourselves out of the mess, we looked about us in bewilderment. The landscape was altered and the sun was glaring fiercely. Suddenly, on a tall snow slope above us we saw something moving. Something big and weird. I shaded my eyes. It was—it had to be—Yeti, the Abominable Snowman. Rosi grabbed his camera and focused. But as he clicked his shutter, another fall of snow pushed him into a crouching position—so his extraordinary picture shows the Abominable Snowman's abdomen.



Himalayas, lat. 28° N, long. 87° E;
f. 22 at 1/25 sec. Plus-X Pan

Critics have asked, why is it all white? Well, obviously, the Yeti has no navel!

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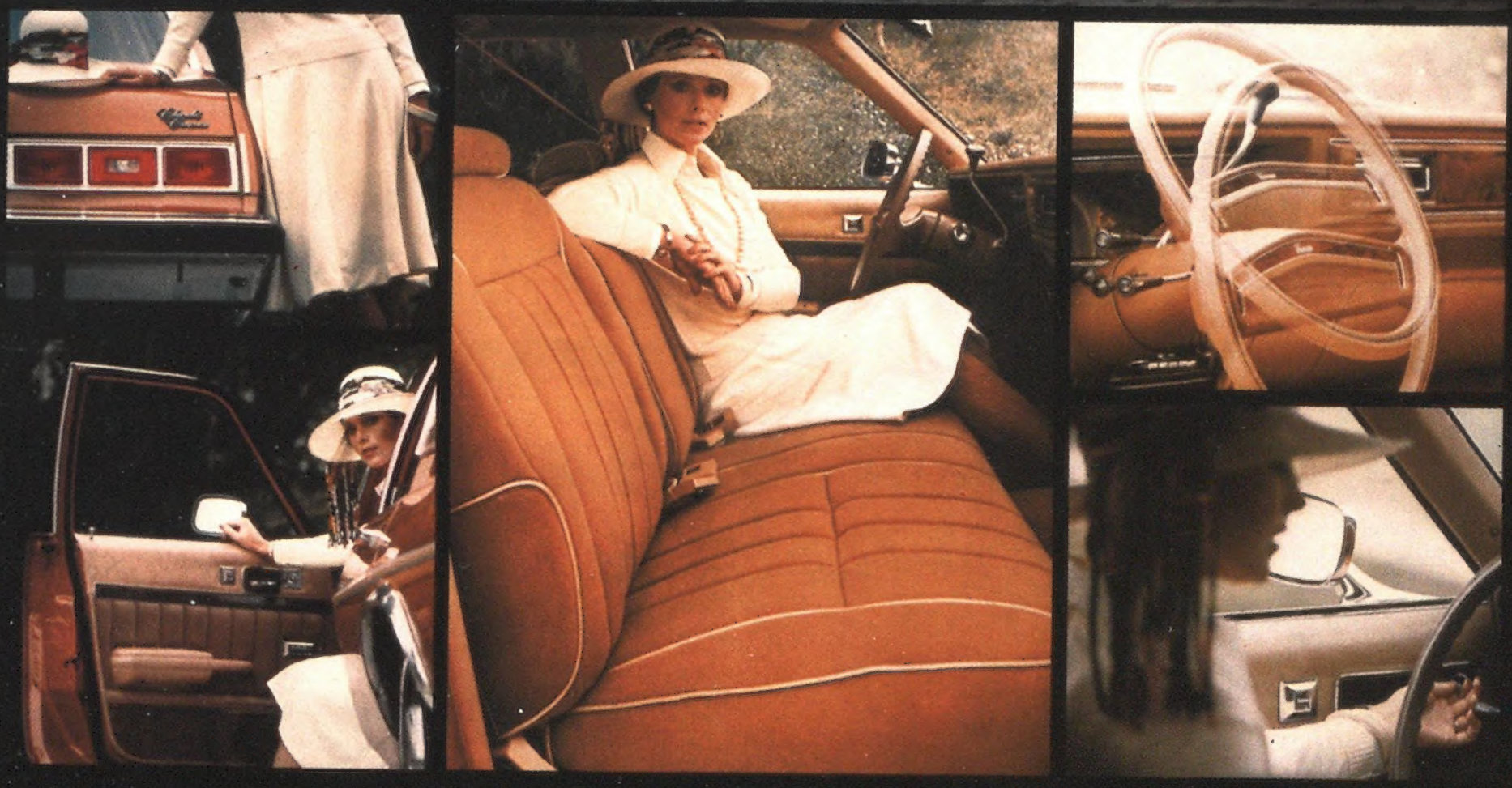

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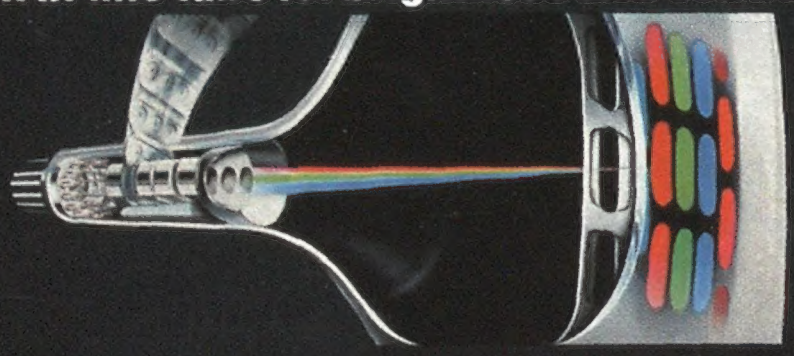

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